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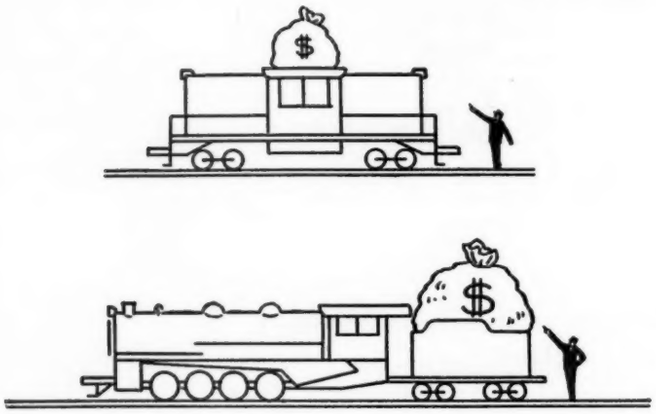
BEFORE YOU BUY SWITCHERS

INVESTIGATE DIESEL-ELECTRIC PERFORMANCE

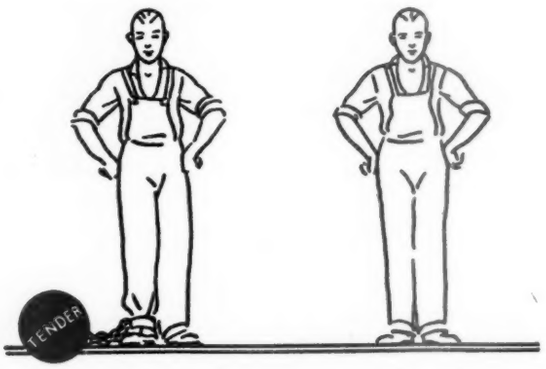
65% Reduction in Fuel Costs

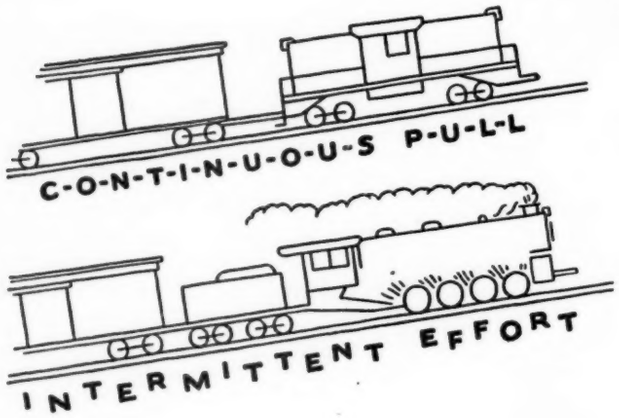


No railroad can afford to overlook the savings that can be made in its fuel bill by operating diesel-electric switchers. Records show that the fuel cost for a diesel-electric is less than 1/3 that for a steam locomotive. In addition, the weight of fuel to be handled is only one-tenth of that for a steam switcher.

No Tender to Haul

Diesel-electric switching locomotives have all their weight on the driving wheels, where it is available for traction. Water for the cooling system, and fuel oil for 60 hours of service, are carried right on the locomotive.





Uniform Tractive Effort

A steady pull is necessary when a locomotive is loaded almost to the slipping point of the wheels. That is why a diesel-electric can start its load easily and smoothly. The continuous torque of the electric motor assures uniform tractive effort at the wheels.

These and many other advantages make the diesel-electric the best locomotive for switching service. General Electric is the outstanding builder of diesel-electric locomotives. Won't you let us analyze your switcher problems and make recommendations? General Electric Company, Schenectady, N. Y.

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GENERAL ELECTRIC

250-4

"Public Opinion, Private Business and Public Relations"

A pamphlet entitled "Public Opinion, Private Business and Public Relations," which it would pay every business man to read, has been written by Samuel Crowther and published by the Liveright Publishing Corporation, New York. It discusses the present public relations problem of business in general in much the same way that the public relations problem of the railroads, in particular, often has been discussed in these columns. Business in general, and, especially, big business, recently has begun to learn, as the railroads long ago should have learned, that public relations present its most vital problem. It is to be hoped that business in general will learn more rapidly how to deal with this problem than the railroads have.

The capitalistic system is based upon the desire and opportunity to make profits by the private ownership and operation of property. Several of the most important government policies of regulation and taxation now being carried out constitute a war upon capitalism, because their purpose is to restrict or abolish opportunities to make profits. Why is this war upon the profit system being waged? One reason is, that so many men prominent in finance and business sought and made profits, during the recent period of prosperity, by illegitimate means, and that there was no manifestation of a sentiment among business men in general which condemned their methods.

Another reason is that business managements and, especially, managements of big business, have devoted themselves almost exclusively to production and sales, in disregard of the fact that an increasing amount of skillful and effective propaganda has been conducted against the entire capitalistic, or profit, system. The longest and most profound depression in history disclosed the weaknesses of this system. It resulted in many scandalous disclosures of the greed, commercial immorality and incompetence of men prominent in finance and business. It seemed to justify the attacks that long had been made upon entirely defensible principles and methods of the capitalistic system. The result has been much legislation for "reform" and the threat of more. "The dilemma of business and finance is confusing to those on the outside looking in," says Mr. Crowther, "but it is a deal more confusing to those on the inside looking out. The cry is for a spokesman—for a leader. But what will the spokesman speak about? And whither will the leader lead?"

"How Did He Get It?"

If the profit system is to be preserved business men must assume a different attitude toward profits. We had arrived at the place in this country where the important question was, "How much has he got?", and not, "How did he get it?" The railroad business has been as efficiently and honestly conducted since the war as any other, and yet from that field an example may be used which illustrates the point. The *Railway Age* conducted an editorial campaign against so-called "reciprocal buying" upon the ground that for traffic and purchases to be used to influence each other was unsound in principle and contrary to the interest of the railroads as a whole. We were constantly told that this campaign would be futile because "everybody was doing it." This was exactly the trouble. Everybody, or almost everybody, was doing it. Those who made this answer apparently did not realize that it was not a defense, but an indictment.

When, under the capitalistic system, everybody, or almost everybody, in business tries to take advantage of apparent opportunities to get rich by the use of methods that are economically, or even morally, unsound, the inevitable result is an economic debacle such as has occurred and demands for "reform" by means as unsound as the business practices that helped to cause the debacle. It is also true that numerous officers of corporations have used inside information to

"bull" or "bear" their own stock; that numerous investment houses have unloaded stocks upon investors at prices that those selling them should have known were excessive; that the largest bank in the country through an affiliate sent out salesmen to urge small investors to buy its stock at ten times its present price; that the head of one of the largest banks organized a pool to sell its stock short; that numerous business men, and even entire industries, have influenced legislation involving the use of the regulating or taxing power of the government to enrich themselves at the expense of other industries or the public; and so on. That there was little condemnation of these practices by business men when they were occurring indicates the level to which business morals had sunk.

What is going to be the sentiment of business men in future regarding such practices? This is a question of great importance. Business will have to reform itself if it is to avoid "reform" by government measures which will do more harm than good. Business cannot reform itself until there is developed among business men generally a sentiment which discriminates between different ways of getting money and condemns those who get it by methods which do not increase the total national wealth and income, but merely take it from the real producers and savers.

Whatever its faults, however, and whatever the abuses that have occurred under it, the capitalistic, or profit, system is fundamentally sound. It is essential to the welfare of everybody that total wealth and income shall continue to be increased. They have never been increased as much under any other system. There is no reason for believing that they could be increased as much in future under any other system. But there are millions of people who do not now believe this. In their minds the depression has justified the propaganda which long has been carried on for the transfer of the control and direction of finance and business, at least big business, from private to governmental hands. The great economic problems of the nation have ceased to be almost entirely economic. They have become largely political, because the determination of how they shall be dealt with has passed largely into the hands of public men, most of whom will deal with them in accordance with their views as to what a majority of the voters want done.

Thus private business finds itself faced with the necessity of accepting more government control and less or no profits, or of reviving or creating a public opinion that will favor private investment, freedom of private initiative and profits in business. Most of the financial and business leaders of the United States are poorly equipped to deal with the problem presented. It does not follow, because a man has made a fortune or is an able production or sales executive, or a good lawyer, that he will know how to influence public opinion, but many men of wealth, or of executive or legal ability, do not realize this. Many of them seem to think that influencing public opinion is unimportant, or that it can easily be done by persons who have had no experience in that line of endeavor, and, in consequence, usually when an important business concern or industry first undertakes to influence public opinion, the results leave much to be desired.

Striking Examples of Effective Propaganda

We have recently had some striking examples of the effective use of publicity in this country. During the Hoover administration the Democratic National Committee, under the chairmanship of John J. Raskob, employed a newspaper man of experience and ability who did his work so well that it was largely responsible for driving the Republican party from power. Under the direction of the same newspaper man, the Roosevelt administration has carried on a campaign of propaganda for its policies to which has been largely due their adoption and popularization. When the automobile industry recently got into a struggle with the labor leaders, it resorted to the placing of display advertising in leading newspapers throughout the country, and also issued several statements, which were ostensibly addressed to its own employees, but actually were addressed to them and the public, and it has thus far been more successful in avoiding union domination than any other major industry against which the labor leaders have made a drive.

Now, it is probably not without significance that Mr. Raskob formerly was chairman of the General Motors Corporation, and that consequently the publicity policies carried out by the Democratic National Committee, the Roosevelt administration and the automobile manufacturers in their recent labor controversy all originated, directly or indirectly, with the automobile industry, or men who had been connected with it. In other words, they originated with men who had been or are now connected with an industry which is accustomed to carrying on extensive advertising and publicity campaigns in selling its products to all classes of the people, and who, therefore, have no hesitation about spending the amount of money necessary to influence the public and know how to do it.

A Problem of All Business

Whatever may be the competitive rivalries of the railroads and the automobile industry, or between any other industries, it is plain that all private business is confronted with the threat of policies of taxation and governmental regimentation which would seriously hinder, if not make impracticable, the successful functioning of the system of private financing, ownership and management of business. "Both business and finance are today nearly inarticulate," says Mr. Crowther in his pamphlet. * * * "There is a general attitude that minding one's own business is occupation enough for any man. * * * But just what in these days constitutes, on the part of a high executive, minding his own business? Is the whole duty of the executive of a corporation performed if he only minds the business of the corporation? Is not a larger duty laid on him?" There can be only one answer to these

questions. The economic system of the United States is facing a crisis which it can pass safely through only if financial and business leaders first create a sentiment among themselves in favor of private financial and business policies which will reduce just demands for reforms by governmental force, and, second, at the same time, provide the brains and means necessary to educate public sentiment in favor of a revitalized and free capitalistic, or profit, system. The examples recently afforded by the Democratic National Committee, the Roosevelt administration and the automobile industry of how to influence public opinion may be studied with profit by many financial and business leaders.

Politics and Pensions

President Roosevelt should veto the railway pension bill which was jammed through Congress by the pressure of the railway labor organizations last Saturday. The office of the Federal Co-ordinator was set up to investigate this as well as other railroad problems and there is no study upon which Mr. Eastman is engaged which is being pursued so extensively as this one is. The Co-ordinator opposed as unsound the measure which Congress passed and asked that legislation on this subject be delayed until the next session, by which time his study will be completed and it will be possible to propose a scientific plan based upon sound information. As Mr. Eastman testified before the House committee on interstate commerce, "It is desirable to suffer this comparatively short delay rather than to adopt a measure having the imperfections" of the bill which Congress passed.

Congress and the Administration have so far failed signally to support Mr. Eastman in the task assigned to him. They created the position of Co-ordinator, assigning to that position the duty of investigating and reporting upon needed transportation legislation, thus giving the impression that they intended to deal scientifically with transportation. Having done this, they completely ignored his carefully prepared recommendations for the regulation of highway and water transportation. Now Congress has further showed its contempt for a scientific solution of a major phase of the transportation problem by passing a political measure, without a vestige in it of consideration of the facts. If the President by signing this bill should show his agreement with Congress that serious railway problems should thus be settled upon a basis of political expediency rather than scientific study, then the title of Federal Co-ordinator might better be changed to Federal Speechmaker on Transportation, because that is the only function which will remain to the position.

The bill, it is estimated by impartial observers outside the ranks of either railway managements or organized labor, will cost the railways an average of from 40 million to 70 million dollars per annum for the first four years it is in effect. This is a stupendous sum with the railroads in their present financial condition, and particularly so since it does not take into account existing pension payments. That Congress should pass such a bill while neglecting to enact similar legislation affecting railway competitors or even providing regulation for these competitors such as that to which the railways are already subject, is conclusive evidence, if any were needed, that the railroads cannot expect to get justice in Washington in proportion as they deserve it, but only in proportion as they will fight for it by political methods—the only argument to which politicians will listen.

If the President approves the bill, the railways will be forced to adopt a policy hereafter of employing only very young men, which will work a severe hardship on experienced men of more mature years now out of work who might otherwise hope to re-enter railway service as business improves. Moreover, railway employees who are not old enough to be retired under the bill should not overlook the fact that students of the bill predict that under it payments into pension funds in a few years will require from 10 to 15 per cent of the total payroll, which means a payment by employees of from 3 per cent to 5 per cent of each pay check.

How High Pensions Will Affect Employment

When the railways occupied a more nearly monopolistic position in the transportation field, it was possible to "pass on" through higher freight and passenger rates a considerable portion of the burden of high wage scales; today, when the railways must meet sharp competition with respect to an important volume of traffic, attempts to shift that burden to the public will accomplish only a reduction in the volume of competitive tonnage moving by rail and the imposition of an additional cost handicap in the market upon tonnage that must move by rail. To compete successfully with the newer agencies of transport railway rates covering certain movements, particularly short hauls, must be reduced; to such a reduction labor costs, as almost half of the total cost of service, must contribute measurably.

In the face of price competition that grows increasingly keen it appears that, until rival agencies are burdened with total service costs and certain other restrictions are imposed in the interest of public safety and social policy, railway workers must choose between a small volume of employment at high wage rates and a greater volume at lesser rates—which may yield a larger annual income per worker, though is not certain so to do. But there is little to indicate that railway labor has made an economic analysis of the problem with which it is faced and has recognized the necessity in self-interest of major concessions in both restrictive rules, where such exist, and rates of pay.

From "Inland Transportation," by Professor Sidney L. Miller of the University of Iowa.

New York Central Completes Elevation Busy Freight Line in New

Long viaduct to be placed in service on July 2 as a part of extensive west side improvements, will remove rail traffic from streets — Air rights possibilities a feature

ON June 28 appropriate ceremonies will mark the completion of the south half of the New York Central's extensive program of freight line improvements along the west side of Manhattan Island in New York City, improvements which will eventually remove all railway traffic from busy streets throughout the city. On July 2, 2.3 miles of elevated double-track line, carried on a structural steel viaduct almost entirely on private right-of-way, will be put in service, as well as a large modern freight terminal building covering three city blocks, in which trackage provided for 150 cars is at the second-floor level. These new facilities will bring about revolutionary improvements in the railroad's operating practices on the west side and in its service to shippers, and will greatly enhance the strategic importance of the only freight line on Manhattan Island, which has already played such an important part in the growth and development of the city.

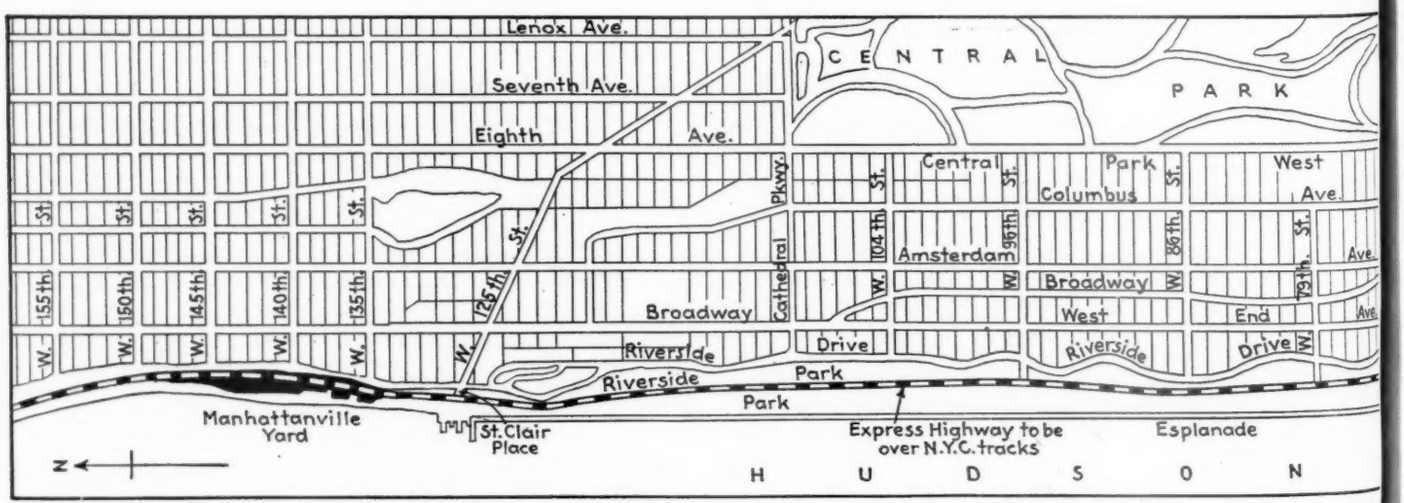
The work that is now completed, which lies entirely south of West Thirty-Fifth street, is the outgrowth of more than 25 years of study, planning and negotiations, and about 5 years of actual construction. Within this territory the new line affords elevated private side-track facilities for a number of important industries, and is so constructed that similar facilities can be provided throughout its length for other industries with minimum difficulty and expense. In fact, the entire new elevated line, except where it crosses streets, is designed to permit air-rights development, the practicability of which is demonstrated in the case of several buildings which already enclose the tracks either wholly or in part.

The large new freight terminal to be put in service is located at the extreme south end of the elevated line and has been named the St. John's Park Freight Terminal after the road's historic rail terminal bearing that name a few blocks further south, which it replaces. This new terminal, which incorporates many features of design, arrangement and equipment to insure the greatest of efficiency and economy in the handling of freight, from the standpoint of the shipper as well as the railroad, will be described in detail in next week's issue.

West Side Line is 13 Miles Long

The West Side Improvements Plan as a whole, which was outlined in the *Railway Age* for July 27, 1929, shortly after an agreement covering the plan was executed with the city, concerns only the freight tracks of the road on the west side of Manhattan island. These tracks extend north from St. John's Park, about one mile from the lower end of the island, for a distance of about 13 miles, through active commercial and industrial districts and then through Riverside, Fort Washington and Inwood Parks, to a junction with the main line of the New York Central at Spuyten Duyvil, north of the Harlem River Ship Canal. Within this distance there are a total of 105 street crossings, all of which will be eliminated when the plan as a whole is completed.

From its terminus at St. John's Park, the old line runs north at street grade through Hudson street to Canal street, where it turns west to West street, which it occupies north to the intersection of that street with Tenth avenue. From this point it continues north in Tenth avenue to West Thirtieth street, a distance of 18 city blocks, where it swings west through a private right-of-way and enters Eleventh avenue near West Thirty-Third street. Continuing north in Eleventh avenue to West Sixty-First street, the line again enters



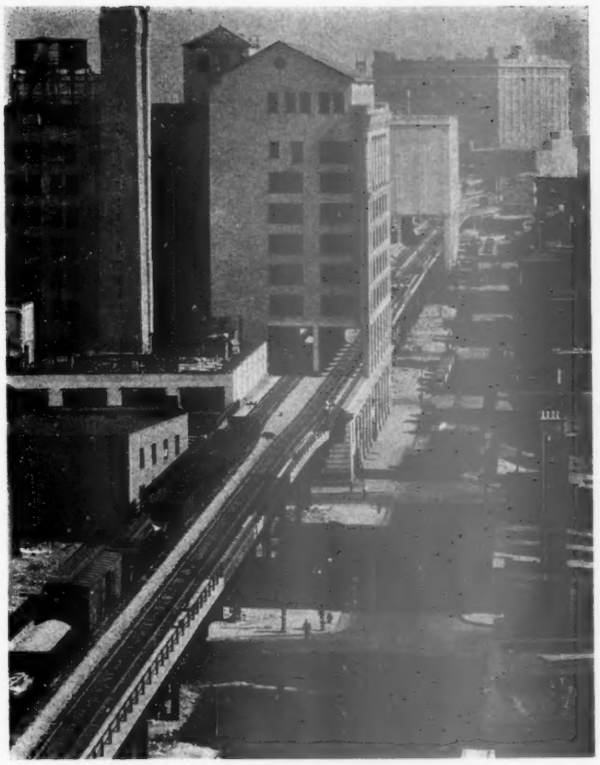
Sketch Plan of the West Side of Manhattan Island, Showing Location of the New York Central's West

# of 2.3 Miles of York City

a private right-of-way along the Hudson river, through which it extends to Spuyten Duyvil, crossing several streets at grade.

The west-side line, which is the only freight line on Manhattan island, has played a most important part in the growth and welfare of New York City, giving direct through-rail access, without the delays of lighterage, for food products, milk, mail, express, merchandise and other commodities essential to the city. Throughout, the line is double tracked and has numerous sidings, private spurs and team delivery tracks, in addition to several yards.

Until the last few years the line has always been operated by steam, special boxed-in locomotives being used south of West Thirtieth street. During 1930 and 1931, the third-rail electrification of the main line electric zone was extended down the west side to West Seventy-Second street and the road began the substitution of electric and Diesel-electric locomotives for the steam locomotives for much of the switching north of West Sixtieth street, and for all train movements south of that point.



Looking Over the Elevated Tracks Along Washington Street

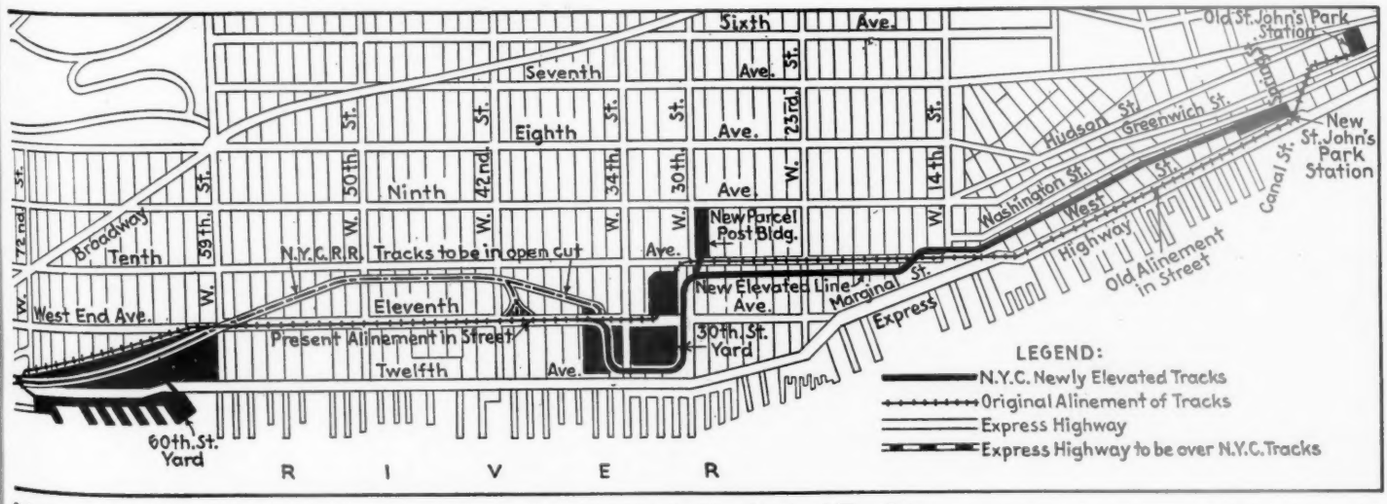
Several Large Yards Involved

The principal yards serving the west side line are the Sixtieth Street yard, located between West Sixtieth and West Seventy-Second streets, and the Thirtieth Street yard, which is bounded by West Thirtieth street on the south, West Thirty-Seventh street on the north, Tenth avenue on the east, and Twelfth avenue on the west. The former of these yards, which is the largest on the line, has capacity for 2,287 cars. This yard, which is the point of initial break up for most eastbound trains, or those received on the line, has a large number of classification and team tracks and an engine terminal, and, in addition, serves several piers and transfer bridges, a milk station, a grain elevator and automobile and live poultry facilities.

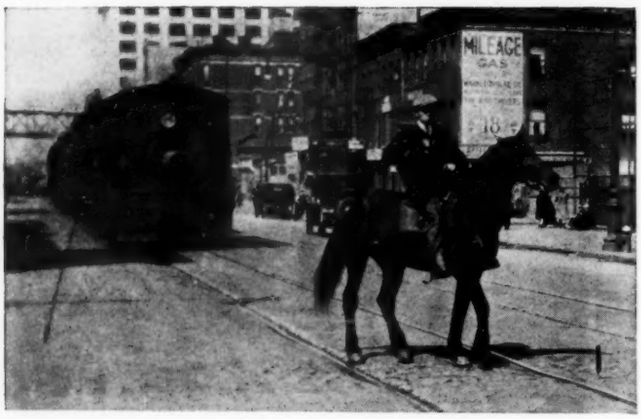
The Thirtieth Street yard, which is the second largest on the line, occupies ten city blocks and has capacity for approximately 1,347 cars. This yard serves a large number of warehouses, a wholesale provision market, an express terminal, a hay market, two transfer bridges, three piers, inbound and outbound freighthouses, team tracks and an engine terminal. Other smaller yard facilities on the line are located at West Seventeenth street, West Forty-First street, and at Manhattanville, in the vicinity of West One Hundred and Forty-First street.

Old Line Presented Operating Difficulties

In the operation of the line, every attempt is made to give the most prompt delivery, especially to mail, express, milk, meats, and fresh produce of all kinds, which together make up a large part of the shipments handled. To speed up the handling of mail and express, the delivery of which is centered in the vicinity of West Thir-



Side Elevated Freight Tracks South of Thirty-fifth Street and Changes Under Way North of That Point



One of the Old Hooded Steam Locomotives in Tenth Avenue, Preceded by a Mounted Flagman

tieth street, Diesel-electric locomotives bring the cars directly from Harmon, N. Y., at the north end of the main-line electric division, to the Thirtieth Street yard, without break-up at the Sixtieth Street yard. Similarly, northbound mail and express cars are handled directly from Thirtieth street to Harmon in a through movement.

Practically all other shipments and commodities handled over the west-side line are brought on to the line and as far south as Seventy-Second street by the electric division locomotives. Here, the cars are classified in the Sixtieth Street yard and then moved south over the line by the Diesel-electric locomotives. Some of the cars are moved direct to industries or to the St. John's Park terminal, but most of them are taken into the Thirtieth Street yard for further classification, holding, or for special assignment. In the northward movement, except for mail and express, cars are advanced by Diesel-electric locomotives to the Sixtieth Street yard for classification and make up into trains. From here the assembled trains are advanced to Harmon by the main line electric locomotives. South of Manhattanville, the line is operated without signals.

For many years the west-side line was adequate, and even its location in the streets presented no serious difficulties, but with the growth of the city, and especially along the west side where the growth was occasioned largely by the line itself, it became greatly overtaxed, especially in the yards, presented hazards to pedestrians and other traffic, and in other respects was operated under many difficulties.

Until the last few years many restrictions were placed by the city on the operation of the line. For example, weekday movements in Eleventh avenue were restricted to specific periods between 6:50 a.m. and 5:15 p.m., and train lengths between 8 a.m. and 7 p.m. were limited to 25 cars. Neither the hours of movement nor train lengths was restricted south of West Thirtieth street, but the railroad found it advisable to make most of its movements in this territory at night and to limit the lengths of trains to 15 cars.

To promote safety south of West Thirtieth street, where the movements have been entirely in the streets, all trains have been preceded by flagmen on horseback, who warn vehicles and pedestrians. North of West Thirty-Third street, up Eleventh avenue, practically all of the cross streets have been protected by crossing watchmen 24 hours a day.

Many Train Movements Daily

The importance of the difficulties encountered in operating the west-side line is understood clearly when it is realized that from 60 to 70 trains, eastbound and westbound, are handled daily between West Sixtieth street and Spuyten Duyvil, with an average of 794 loaded cars inbound and 884 cars outbound. Of the eastbound cars received at the Sixtieth Street yard, about 40 per cent are moved south through the streets to the St. John's Park and Thirty-Third street freight stations. Likewise, of the westbound cars delivered to the Sixtieth Street yard, about 32 per cent are received over the city streets from the St. John's Park and Thirty-Third street stations.

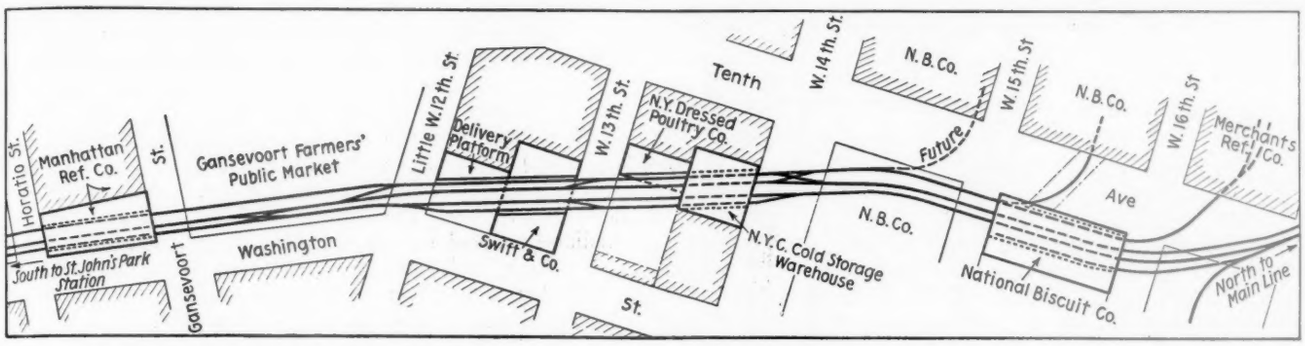
To overcome all of the disadvantages occasioned by the surface-level line, the railroad and the city, in 1929, agreed to a plan which provided for the removal of all tracks from the streets south of West Sixtieth street, and the elimination of steam motive power. The plan also called for a number of major improvements to be made by the city, the most important of which is an elevated express highway from West Fifty-Ninth street, north to Spuyten Duyvil, to be located directly over the tracks of the west-side freight line. This highway will extend south to Canal street, near the lower end of the city, and is partially completed and in service in this territory. However, south of West Fifty-Ninth street, it is independent of the railway improvements.

In the agreement with the city, the railroad agreed to elevate its west-side tracks south of West Thirty-Fifth street, on private property outside the street lines, and to depress the tracks north to its Sixtieth Street yard on a new alinement outside of Eleventh avenue. To the present time, work has been concentrated on the track elevation work, and it is this phase of the project which has been completed and which will be dealt with primarily in the remainder of this article.

Elevated Tracks Are Out of Streets

The new elevated section of the west-side line begins at the northeast corner of the Thirtieth Street yard,

Looking Southwest Over a Section of Thirtieth Street Yard and the New Elevated Loop Around the Yard



The Elevated Tracks Between West Seventeenth and Horatio Streets, Showing Typical Industrial Air-Rights Development

practically at the intersection of Eleventh avenue and West Thirty-Fifth street, the point of transition between track elevation and track depression called for in the agreement with the city. In a radical change from the old alinement, the new line swings abruptly to the west out of Eleventh avenue and rises on a 1.6 per cent grade along the north side of West Thirty-Fifth street. Still gaining altitude, but on a lighter gradient, it then swings directly south along the east line of Twelfth avenue, and, at West Thirty-First street it swings back to the east along the north line of West Thirtieth street, recrossing Eleventh avenue, but now overhead. The purpose of this three-sided jog or loop in the line is to keep the overhead structure outside the limits of the Thirtieth Street yard, and, at the same time, to gain altitude in changing from the depressed tracks planned north of West Thirty-Fifth street, and the elevated tracks south of West Thirtieth street.

All of the property included within the loop between West Thirty-Fifth and West Thirtieth streets is owned by the railroad and is occupied by yard facilities, at present at grade. Future plans call for the rearrangement of these facilities, and the elevation of Eleventh avenue across the yard, from West Twenty-Ninth street to West Thirty-Seventh street. When this is accomplished, Eleventh avenue will pass beneath the main track viaduct at West Thirtieth street, as at present, and over all of the yard tracks and the main tracks at West Thirty-Fifth street.

Between Eleventh and Tenth avenues, the new line swings directly south into a private right-of-way, parallel with and about 100 ft. west of Tenth avenue. Directly at this point of swing, a double-track elevated spur continues to the east, crosses Tenth avenue, and gives direct service to a new government parcel post building occupying the entire city block east of Tenth avenue, between West Twenty-Ninth and West Thirtieth streets.

South of West Thirtieth street, the main tracks, 100 ft. back from Tenth avenue, continue to West Eighteenth street, where they veer to the east and cut diagonally across Tenth avenue and the streets between West Seventeenth street and Little West Twelfth street, a section occupied largely by meat packing houses. At Little West Twelfth street the tracks cross over the Gansevoort Farmers' Market and then enter a private right-of-way which extends along and immediately adjacent to the west line of Washington street. This new right-of-way continues south through 15 city blocks to LeRoy street, which is at the throat of the track layout which will serve the new St. John's Park freight terminal.

Many Buildings Razed

The new alinement over private property rather than above city streets required the purchase of much valuable property, and, as might be expected, the purchase and razing of many buildings. In fact, more than 300 buildings of different sizes and types, from old frame dwellings to large multiple-story warehouses, had to be cleared away to permit the elevated track construction. Possibly the largest building razed was a ten-story steel and concrete warehouse, which was about 200 ft. long by 150 ft. wide. In several cases the fronts of buildings had to be cut away to make room for the elevated tracks, and in one case the viaduct was extended through a large occupied building.

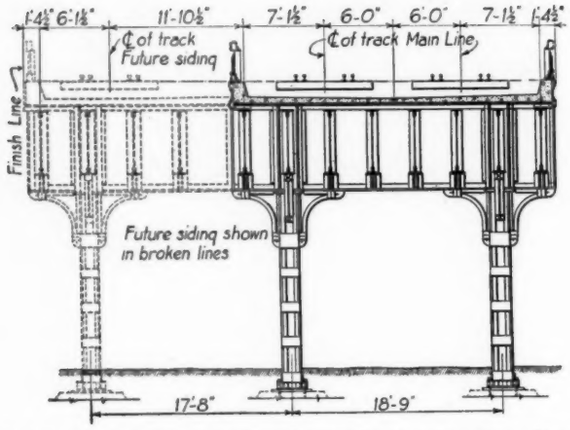
In still another case, a brick church, about 50 by 100 ft., had to be acquired and razed. In this case, the railroad replaced the building on a new location with a modern steel-frame brick-faced structure, about 100 ft. square.

The overhead structure employed south of West Thirty-Fifth street was decided upon primarily because of the fact that track depression throughout this territory, with proper cover, would have placed the tracks at an elevation about 30 ft. below mean high water in the Hudson river, involving difficult and expensive construction. Furthermore, the expense of keeping the subway free of water would have been large, and the adding of industrial sidings or spur tracks in the future would be so costly as to be practically prohibitive.

Details of Viaduct Construction

Throughout its length, the new elevated line is double-tracked, with a number of elevated sidings and industrial spurs. The viaduct carrying the tracks is of much the usual type, consisting essentially of two-column bents employing built-up columns and cross girders, with eight lines of built-up girder-type stringers between them. Where the structure supports a single siding in addition

The New Elevated Tracks Crossing Over Tenth Avenue, Through Which Trains Have Operated for Many Years


1'-4½" 6'-1½" 11'-10½" 7'-1½" 6'-0" 6'-0" 7'-1½" 1'-4½"
℄ of track Future siding
℄ of track Main Line
Finish Line
Future siding shown in broken lines
17'-8"
18'-9"

Typical Section Through the Two-Track Elevated Structure, Showing Arrangement for Future Private Sidings

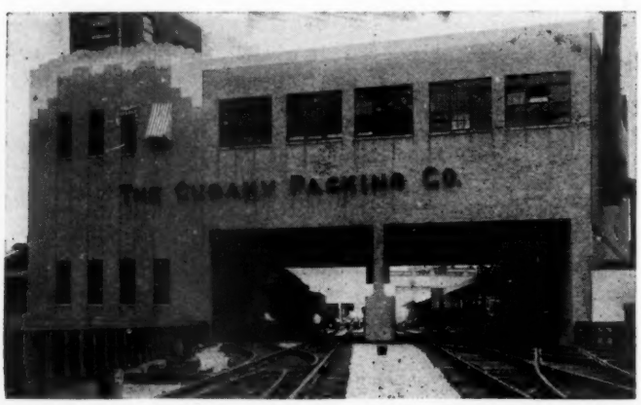
to the two main tracks, three-column bents are employed, and where there are two sidings, one on each side of the main tracks, four-column bents are used.

This same general type of construction is employed at street crossings, except at the wide diagonal crossing of Eleventh avenue where through girder construction is used. At all streets 60 ft. or less in width, single spans are employed, while, in general, where the crossings exceed 60 ft., intermediate bents are provided at the curb lines. All sections of the viaduct afford minimum under-clearance of 14 ft.

The deck of the viaduct is a reinforced concrete slab, 10 in. thick, continuous between deep curbs on each side but broken longitudinally by transverse expansion joints over the bent lines. This deck is waterproofed with two layers of asphalt-treated cotton fabric laid in three moppings of asphalt, and the water-proofing is covered with a three-inch concrete protection course. Drainage of the deck is toward the center line from each side and thence to outlet boxes at intervals of approximately 10 ft. along the center line. The water from the different boxes is collected beneath the deck in channel troughs which are pitched to pipe drains at the bents.

The entire viaduct is of generally pleasing proportions and appearance, and is painted the road's standard green. However, since much of the structure is already hidden from view by buildings or will be enclosed by the development of air rights in the future, no attempt was made at ornamentation except for the use of curved structural brackets at the column-girder connections, and ornamental steel balustrades at each of the street crossings. Between streets the viaduct is fitted with pipe railings.

The track structure, except for the sidings within



The New, New York Central Cold Storage Warehouse Is One Type of Possible Air-Rights Development Over the Elevated Tracks

building areas, consists of 105-lb. rail and creosoted ties supported on 10 in. of crushed stone ballast. In the case of the sidings directly alongside packing house platforms, the rails are supported on either short or full length ties embedded in concrete, the purpose of this being essentially to facilitate the work of keeping the track clean at these loading and unloading points.

South to about Bank street the track materials were delivered by rail, the first track being constructed immediately ahead of the material trains, and the second track later with materials unloaded from cars on the first track. South of Bank street, at which point there was for a time a short incompleted section of the viaduct deck which prevented the movement of material trains, all of the track materials, including ties and rails, were delivered over the city streets by trucks and were hoisted up on to the viaduct by a crane operated in Washington street. At the deck level, a light truck-crane assisted in distributing the materials and in setting in the rails.

Several Types of Foundations Employed

While there was little of special interest in connection with the erection of the viaduct superstructure, the construction of its foundations presented a variety of problems, owing largely to special building conditions in different sections. From the St. John's Park terminal north to West Thirtieth street, except directly through or alongside certain buildings, poured-in-place concrete piles were employed in the foundations, these being generally 15 in. in diameter and ranging from 10 to 50 ft. in depth. From West Thirtieth street west to about midway between Eleventh and Twelfth avenues, and east on the elevated two-track spur serving the parcel post building, a total distance of approximately 1400 ft., concrete cylinders, either built in the open or put down under air, were employed. This type of foundation, which was carried down to rock in all cases, was employed in this section both because rock lay relatively close to the surface, 20 to 40 ft., and because it is intended that these footings will some day carry the loads of buildings built adjacent to the viaduct.

The remainder of the viaduct around the Thirtieth Street yard loop is supported on timber piles, except directly on each side of West Thirty-Second street. Here, concrete columns, put down about 105 ft. to rock in pneumatic caissons, were employed to carry the viaduct over the Hudson River tunnels of the Pennsylvania Railroad.

In several short sections south of West Thirtieth street where the viaduct extends through or close to certain new buildings, concrete footings, put down in pneumatic caissons, were employed and were made to carry the building loads as well as the viaduct. In one case of this character, steel shell piles, blown out and filled with concrete, were employed.

Unusual Caisson Work Necessary

The most interesting of the viaduct caisson work was carried out in connection with extending the viaduct through a large building occupied by the Bell Telephone Laboratories, Inc. Here, to prevent the transfer into the building of noise and vibration from train operation, it was essential that the viaduct foundations be entirely independent of the building foundations. Furthermore, it was necessary that the work of placing the viaduct foundations be carried out without disrupting the normal operations within the building.

The laboratory building, which faces on Washington street between Bethune and Bank streets, consists of two units, one an eleven-story steel-frame structure sup-

ported on concrete piles, and the other a three-story structure supported on short timber piles. In passing through these units, the viaduct occupies the greater part of the second, third and fourth stories of the larger unit and both of the upper floors of the lower unit.

The foundation constructed to carry the viaduct includes eight concrete shafts, 4½ ft. in diameter, which were carried down from 60 to 80 ft. to solid rock. These were constructed largely by the pneumatic caisson method, which was necessary in order not to lose ground and cause settlement in adjacent building piles.

Because of laboratory operations in the basement and on the first floor, which could not be disturbed, all of the work of sinking the caissons was carried on from the second floor, through walled enclosures in the lower levels. An unusual feature of the work was that the caisson sections were jacked down, using the dead weight of the building principally for the jacking reaction. The material encountered was largely sand, all of which was handled up to the second-floor level and then dumped over chutes into trucks on the street level.

In addition to constructing the viaduct foundations entirely independent of the building foundations in order to prevent the transmission of noise and vibration, the viaduct itself was insulated from its foundations by lead and asbestos vibration pads.

Interesting Air-Rights Developments

One of the most important and interesting phases of the west-side elevated line is the opportunity which it affords for air-rights development and direct service to adjacent industries, either by side tracks or private spurs. Throughout its length along Washington street, it is expected that some day large industrial plants and warehouses will take advantage of the air-rights possibilities and will be built out over the elevated track structure to the street curb line. Where the viaduct passes through the center of blocks the possibilities for air-rights development are even greater than along Washington street. Here, where side track facilities can be afforded on both sides of the main tracks, buildings can be extended beneath, up both sides and over the tracks if desired.

What the future holds in this respect is made evident in certain buildings already built alongside or over the tracks. One of these is a railroad-owned cold storage warehouse, a three-story brick-faced steel and concrete structure, about 100 ft. by 110 ft., which faces on Fourteenth street. This building completely envelopes the viaduct structure, which, at this point, carries east and west sidings as well as the two main tracks. The east side of the building and the floors above and beneath the tracks are occupied by the Cudahy Packing Company, while the west side is used essentially as a receiving unit by Armour and Company and the Wilson Packing Company. Both sides are served by car-floor-height concrete platforms, which, in turn, are served by freight elevators.

Just north of the cold storage warehouse, between West Fifteenth and West Sixteenth streets, the new line serves two large buildings of the National Biscuit Company, one, a new six-story steel-frame unit directly over and around the viaduct, and the other a large building located west of the viaduct, on the opposite side of Tenth avenue.

The former of these buildings, replacing a six-story structure which had to be torn down in part to permit the viaduct construction, is served by a stub-end siding parallel with the main tracks, while the old building on the west side of Tenth avenue is served by a private spur carried across the avenue on a through girder bridge. In the block immediately north of the National Biscuit Company layout, another high-level private spur crosses Tenth avenue on a girder bridge and enters the plant of the Merchants Refrigerator Company.

Buildings to Line Washington Street

Two other buildings which typify the commercial building possibilities throughout the length of the elevated line are a Swift and Company building at West Thirteenth and Washington streets, and the Manhattan Refrigerator building between Horatio and Gansevoort streets. The former of these, a brick-faced steel and concrete structure, about 100 ft. by 145 ft. and four stories high, extends beneath and up both sides of the viaduct in a layout somewhat similar to the New York Central's cold storage warehouse building, except that it does not extend over the tracks. Sidings serve platforms on both sides of the building at the fourth-floor level, and elevators provide for the ready handling of meats and other products to the floors beneath.

Eventually, Many Large Buildings Adjacent to the Elevated Line Will Be Served by Private Sidings

The Manhattan Refrigerator building, which is typical of the building possibilities along Washington street, is a nine-story structure, with its upper five stories extending out over the viaduct to column supports at the street curb line. Up to and including the floor above the track level, the building is of steel-frame construction, while above that point it is entirely of reinforced concrete.

This building, as all future buildings along Washington street can be, is served by a west-side siding which extends directly along a loading and unloading platform within the building. From this platform, elevators reach all of the floors, permitting the rapid and convenient handling of shipments between cars and the building, and entirely under cover. A further convenience to operations afforded by this building-viaduct arrange-

ment is the fact that the open area directly beneath the viaduct affords undercover back-up space for trucks, entirely outside the street lines. This arrangement is possible in the case of all buildings to be built along or over the viaduct on Washington street, and will not only facilitate truck loading and unloading operations, but will greatly relieve traffic congestion in the street.

Line Adapted for Future Buildings

In the cases of all of the new buildings mentioned, the buildings, at least as regards their relation to the viaduct structure, were designed and constructed with the elevated tracks in mind. In fact, as already mentioned, several of the buildings have certain of their foundations in common with the foundations of the viaduct, and, in at least two cases, the buildings were built around short sections of the viaduct which were completed in advance of the viaduct as a whole in order to simplify the building construction. Future buildings bordering the viaduct must conform to necessary clearances, but other than that, the viaduct foundations are sufficiently deep to permit basement excavation and building foundation construction as required.

The largest building served directly by the newly elevated line is the Morgan Parcel Post building, a new six- and ten-story structure, which occupies the entire city block between Ninth and Tenth avenues and West Thirtieth and West Thirty-First streets, an area 800 ft. long and 200 ft. wide. This building, which is served by the two-track elevated spur at West Thirtieth street and Tenth avenue, has six stub-end loading and unloading tracks on its second-floor level, which have a combined capacity for 36 cars. The tracks are grouped in pairs with wide high-level platforms between them, and the platforms are served by elevators and elaborate conveyor systems. The street-level floor of the building, which is used largely for the weighing and sorting of mail, affords truck back-up space along both West Thirtieth and West Thirty-First streets.

Remaining Work is Now Under Way

With the south half of the West Side improvements out of the way, the railroad is now concentrating on the depression of the freight tracks in a private right-of-way between West Thirty-Fifth street and West Sixtieth street, which, when completed, will remove the existing tracks from Eleventh avenue for a distance of 25 blocks. Practically all of the railroad work north of the Sixtieth Street yard has been completed with the exception of the elimination of track and street grades at West Seventy-Ninth street and West Ninety-Sixth street. These two projects are being held up temporarily awaiting the determination on the part of the city as to the proper treatment of the elevated express highway which will cover the tracks throughout this section.

The railroad work involved in the West Side Improvements as described was started and carried forward under the direction of the late F. B. Freeman, chief engineer of the New York Central until his retirement in September, 1933. Since that time the work has been in direct charge of J. W. Pfau, the present chief engineer. The principal contractors involved in the erection of the viaduct superstructure were the James Stewart Company and the Geo. A. Fuller Company, while those who handled various sections of the viaduct foundation work included the Frederick Snare Corporation, the Geo. J. Atwell Foundation Company, John Lowry, Inc., and the Arthur McMullen Company. The structural steel employed in the viaduct was furnished by the American Bridge Company, the McClintic-Marshall Corporation, and the Fort Pitt Bridge Works.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended June 9 totaled 615,565 cars, an increase of 37,024 cars as compared with the week before, which included a holiday, and of 46,408 cars as compared with the corresponding week of last year. However, this was a decrease as compared with the week before the holiday, in which the loading totaled 624,567 cars. Loading of coke and live stock showed decreases as compared with the preceding week, and loading of merchandise, grain and grain products, forest products, and live stock showed decreases as compared with the corresponding week of last year. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

Week Ended Saturday, June 9, 1934

Districts	1934	1933	1932
Eastern	138,841	131,297	114,574
Allegheny	127,287	108,697	96,411
Pocahontas	41,190	39,352	29,983
Southern	82,814	85,689	75,901
Northwestern	90,467	72,963	61,250
Central Western	87,569	81,443	78,978
Southwestern	47,397	49,716	44,588
Total Western Districts	225,433	204,122	184,816
Total All Roads	615,565	569,157	501,685
Commodities			
Grain and Grain Products	30,809	36,007	24,627
Live Stock	15,128	15,824	15,219
Coal	101,071	89,256	66,836
Coke	6,924	4,482	2,647
Forest Products	24,522	24,625	17,074
Ore	32,000	10,665	3,141
Mdse. L. C. L.	162,932	168,385	176,485
Miscellaneous	242,179	219,913	195,656
June 9	615,565	569,157	501,685
June 2	578,541	512,974	447,412
May 26	624,567	545,551	521,249
May 19	611,142	535,719	515,628
May 12	601,739	534,806	517,260
Cumulative Total, 23 weeks	13,516,238	11,500,184	12,602,148

Car Loading in Canada

Car loadings in Canada for the week ended June 9 totaled 42,933, which was 1,681 less than for the previous week but 2,109 cars more than for the corresponding week last year, according to the compilation of the Dominion Bureau of Statistics.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
June 9, 1934	42,933	22,810
June 2, 1934	44,614	21,807
May 26, 1934	39,514	23,278
June 10, 1933	40,824	18,615
Cumulative Totals for Canada:		
June 9, 1934	958,890	538,941
June 10, 1933	784,993	400,099
June 11, 1932	956,536	478,072

THE SOUTH AFRICAN RAILWAYS AND HARBORS ADMINISTRATION, for the year ending March 31, 1933, reported a deficit after all charges of £1,193,868 as compared with a 1931-32 loss of £1,818,621. From railway operations alone the 1932-33 deficit was £627,120 as compared to £1,212,386 in 1931-32. In addition to this loss from railway operations the 1932-33 deficit included losses of £165,846 from harbor operations and of £13,902 from steamship services; also included were special appropriations of £100,000 for the betterment fund and £287,000 on account of the deficiency in pension and superannuation funds. Gross revenues from railway operations declined from £24,369,366 in 1931-32 to £22,812,284 in 1932-33. The decline in passenger revenue totaled £526,825 while all classes of freight traffic fell off except mineral traffic, other than coal.

The Freight Car of the Future*

The American railroad cannot stand still— To live it must press on

By J. R. Turney

Director, Section of Transportation Service, Federal Co-ordinator of Transportation

THE keynote of the Co-ordinator's original instructions to his Transportation Section was "modernization." As a result, the work of that section is both objective and subjective. The objectives are better and cheaper transportation. Upon the subjective side its work marks the beginning, I trust, of a new carrier activity—research, critical and constructive self-examination. Co-ordination regards all operations and instrumentalities with both respect and skepticism; questions present things regardless of how well settled or entrenched they may be, but at the same time seeks to avoid enthusiasm for new things and new methods merely because they are new.

The purpose of a freight car is to provide a vehicle which will transport freight cheaply, swiftly and safely. It follows that the economics of freight car design are tractability, flexibility, accessibility and utility, and that the ideal freight car is one which will attain these objectives with the smallest outlay of capital and effort.

Tractability

At the present time in order to move a net ton of freight the railroads (counting the empty haul) move 2½ gross tons, and hence the cost of handling the free load is greater than the cost of handling the pay load. The expense of this non-paying load is so large a fraction of the total transportation cost that it no longer can be ignored. Design of the freight car must be bottomed upon the principle that tare weight and empty mileage must be drastically reduced. Waste of transportation effort when measured in terms of transportation results is due in part to the following: excess weight of the vehicle itself; narrow limitations with respect to its ability to handle various kinds of commodities; lack of conformity of its volume and weight-carrying capacity to commercial sales units; insecurity of the lading; excess friction; and sluggish movement.

Lightness

The tare weight of the present box car is equal to 90 per cent of its average load and 50 per cent of its maximum load. The ratio of tare to pay load is greater than in any other kind of a freight vehicle. The tremendous strains placed upon our freight equipment in trains and in yards has necessitated standards of construction far beyond the need of the load which any particular car carries. A characteristic which distinguishes American railroads from those of other countries is the huge size of the trains. Since a chain is as strong as its weakest link our freight car must be capable of dragging a trailing load of sometimes in excess of 450 times its own weight. Coupled with this fact is the necessity to add still more weight in order to overcome corrosion of the materials now used. The result is that in order to obtain safety in operation structures of iron and steel must be created much heavier than otherwise would be needed. If we assume that the long train is an efficient and economical unit of transportation, it necessarily follows that the strength of the freight car can not be reduced unless and until the weight of the entire train is reduced. Pending the substitution of light for heavy cars—which can only be accomplished over a long period of time by gradual replacement—the present strength must be retained. In other words, light weight cars must be as strong as present cars. Twenty years ago this would have been deemed impossible. In more recent years, however, science and industry, particularly in the kindred fields of automotive and aeronautical transportation, have perfected old metals and developed new metals and alloys which achieve lightness without sacrificing strength.

Today it is possible to construct a freight car equal in size and strength to our present car, but of less than one-half its weight. Even at present costs of these new metals there is little doubt that the economies in operation and maintenance which they will make possible will more than pay their additional initial cost. It is inevitable that those costs will be reduced as the use of the material increases. By-products of economy which will be realized will be longer life and reduced maintenance. Particularly is this true with those of the new metals which claim elimination of painting and other prophylactics against corrosion. *The first specification of the new freight car is that it must weigh less than one-fifth instead of one-half its maximum load.*

Versatility

A substantial part of the excess ton-miles which the railroads drag around the country without compensation is due to the unrestrained use of single purpose cars. A "tank" is unquestionably an efficient unit of equipment for the handling of liquids in one direction. It is a most inefficient unit of equipment when it is handled in the opposite direction. It is inspiring to realize that through the efficiency of the "reefer" we transport food for New England 3000 miles across a continent and deliver it as fresh and as delicious as though it had grown there, but it is depressing to see those long strings of empty freezers crawl west without a dollar in a train load. We enthuse over handling fuel hundreds of miles to heat the homes of our great Northwest, but our own feet grow cold when the empty gondolas start back.

In our anxiety to provide efficient equipment for the load we overlook the fact that it is just as essential to provide a car which will be as efficient on the return movement as it was on the going movement. Our failure adequately to attack this phase of the problem is due in part to a natural desire of the railroads in each section of the country to provide equipment which will best suit their particular patrons, and in no small degree to the demand and traffic pressure of those self-same patrons that they be furnished with that kind of equipment.

* An address before the annual convention of the American Association of Railroad Superintendents at Chicago, June 20, 1934.

Multiple-purpose cars are to be found in closed-top, hopper-bottom gondolas which are already in operation. The same principle should be applied to all types of equipment. Our refrigerator cars should be made as efficient to carry westward the manufactures of the East as they are to carry eastward its food supply.

This means new design, more efficient insulation and probably some form of dry or mechanical refrigeration—all of which are ours for the asking. Modern science has already developed efficient insulating material which can be enclosed in the car frame without loss of cubic freight space, and means of dry refrigeration and heating which are quickly and cheaply available. A further requirement, of course, is that these heating and cooling devices must be quickly attachable to any car. The idea of a box car which will handle liquids in bulk, or a tank which will handle bulk agricultural products is not nearly so fantastic when we remember that one merely requires removable bulkheads no tighter than those already in use and the other, means of cleansing already employed by the railroads.

The second specification of tomorrow's car is that it must be an all-purpose car capable of carrying any kind of freight anywhere and in all weather conditions.

Adaptability

By the beginning of the twentieth century the 40-ton car was coming into use but the average capacity of box cars at the time was less than 25 tons, and of all cars 28 tons. Even as late as 1920 over 80 per cent of the box car equipment had capacities of 40 tons or less, the average being 37 tons. Today the standard box car has a capacity of 50 tons, and the average capacity is over 42 tons. The average capacity of all cars is over 46 tons. This constant increase in the size of the freight car benefited the railroads by enabling them to handle large and economical loads and in former years benefited industry by enabling it to sell in large quantities. It was of major importance in the rapid development of the great metal industries.

At the very time—1920—that the railroad trend toward the 50-ton car became definitely fixed, forces were in motion which are destined not only to check but to reverse the tendency toward larger and larger equipment. These forces are the demand of industry for quick turnover and reduced inventories in order to avoid the evils which were so acutely felt in 1921, and the development of highway motor freight vehicle making possible a completed transportation. If full operating efficiency is to be obtained a large car must have as its tariff handmaiden a high minimum weight. During the period from 1870 to 1920 the minimum weight and the average load kept pace with the increased size of the car. This has not been true since 1920, since an increase in average capacity of over 13 per cent has been accompanied by an increase in average load of less than 2 per cent.

Traffic officials are loath to increase the minimum weights against a contrary pressure exerted by industry, particularly as industry, unwilling to bear even the existing minimums, is going more and more to the highway. With respect to such commodities as coal, live stock, grain, as well as manufactured products, the modern sales unit is diminishing from a carload to a truck load. Railroads are faced with the choice of either carrying a truck load of freight in a car or of cutting their car down to the size of a truck. We need go no further than the "O.S." statistics to find that if the minimum weights are cut so that the giant cars will carry loads of only 10 or 12 tons, as many of them are even now doing, there will be an immediate shortage of red ink in the accounting department. It is Hobson's choice. Like it or not, the cloth must be cut to the size that the customer wants to wear. This will be difficult or not depending upon the ease with which we can make a small orientation in our viewpoint.

Two ways lie open. One is to go back 60 years and build four-wheel 20-ton capacity cars. Within the past few years a refrigerator car of that type has been in operation. This car weighs and carries approximately half as much as its eight-wheel brother. It is claimed that this car can be trained in any part of a tonnage train. Possible objections to the use of a four-wheel car, are its rigid wheelbase and the long period of time required for the change-over from present-day equipment.

The other way also has stood the test of several years of practical commercial operation. It lies in retaining the present car chassis, that is the trucks and underframe, and substituting two or more demountable car bodies for the present single unit. This affords a quick, effective and at the same time a relatively cheap method of killing two birds with one stone—of reducing the size of the car which the customer uses to the size which his business requires without sacrificing car or train loading. *The third specification for tomorrow's car is a demountable multiple unit car body synchronized in carrying capacity with the sales unit of commerce.*

Security

Would I be deemed facetious should I ask if you have stood or tried to stand inside a box car which was moving at a speed faster than a walk? After making such an experiment upon myself I am unable to understand how freight ever reaches destination in the original package. Particularly is this true when we take into consideration the speeds required of the modern freight train. The "cause analysis" of loss and damage to freight reported by you gentlemen to the American Railroad Association, indicates that by far the greater part of the damage is occasioned through the lack of riding quality of the car. If it were necessary for this to be true, then indeed would the railroad be at a distinct and permanent disadvantage when in competition with the automotive vehicle. It is not necessary. Springs have been designed and are now in every day use which will eliminate practically all vertical shocks. Modern brakes, draft gears, air jacks and other cushioning or shock-proofing devices are also offered for which it is claimed that their installation will entirely remove all other shocks to the lading while in transit. Some of these devices are in practical operation; others have been approved by competent technical experts. Whether or not these particular devices will accomplish the purpose is a matter of small moment, the important thing is that that purpose can and must be accomplished. *The fourth specification therefore is shock-proofing.*

Dependability

You gentlemen are meeting the present demand for speed and still more speed with characteristic promptness and efficiency. Permit me to suggest, however, that the most fertile field for attaining speed of movement does not lie altogether in running the wheels off the cars. When you operate at 40 or 50 miles an hour locomotives and cars designed for half that speed you are likely to distribute grief all along the right-of-way. In the nation-wide study made of all car movements which were terminated on December 13 last we found that the average speed of a car from the time it was delivered to the consignor for loading until the time it was released by the consignee after unloading was 2.6 miles

per hour, its speed from the time the consignor released it for movement until it was delivered to the consignee for unloading was 5.2 miles per hour, and the speed while in road train movement was 16.5 miles per hour. Examination of the performance of all manifest trains operated in 1932 revealed many cases where the over-all road speed was in excess of 25 miles per hour. The "algebra boys" tell us that under typical conditions each additional mile per hour over the efficient speed of the locomotive will cost over 75 tons in reduced loading—a high price for speed.

Of course I realize that with the 4-8-4 type locomotive you can attain speed without sacrificing tonnage—but at considerable increase in investment and in maintenance, both way and equipment. Overall speed can be achieved without increase of road haul speed. At present intermediate yardings consume more time than train movement. Further substantial fraction of the time of the train movement itself is spent in acceleration, deceleration, inspection and in taking care of hot boxes, broken wheels, draft gear and the like—the "time outs" of transportation. Modern improvements, such as the "AB"-brakes, various types of improved draft gear, wheels designed for present-day speeds, make many of these delays unnecessary. *The fifth specification is dependability.*

An imperative necessity is a reduction in the time and cost of stopping and starting the train. This is largely a question of friction. As railroad men our usual reaction to the question of useless friction in our freight cars reminds me of the classical question which the Arkansas farmer put to the agricultural extension agent who suggested bigger hogs in shorter time, which was "Well, what is time to a hog, anyway?" In every other form of traction, including, I believe, wheel-barrows and baby buggies, it has been found necessary to reduce as far as possible wastes due to friction. Every time I ride on a freight train, and many of the times I ride on a passenger train, I am impressed with the fact that the salesmen of brasses and journal bearings are almost as good as those who sell lightning rods. Possibilities which lie in the elimination of friction in the movement of our equipment through roller or ball bearings ought to be quickly realized. Hot boxes and brittle wheels and draft gear should have passed out with wooden axles—*which brings forth the sixth specification—non-friction bearings.*

Flexibility

Turning to the terminal we find further opportunities for obtaining speed without sacrificing tonnage. The analysis of car movements which I mentioned reveals that the average car, after loading and before unloading began, spent over twice as much time in the terminal as it did in the road train. What does it profit us to rush a car across a 100-mile division in three hours if we toy with it in terminals for the next six? If we cut the terminal time in half we could decrease the road speed by a like amount, double the tonnage and still make the same over-all speed. The design of the car will play an important part in the elimination of terminal detention.

If a fraction of the thought, time and money which have been expended in fighting transportation of persons and property by highway had been expended in developing ways and means of adapting and putting to railroad use the automotive vehicle there would be little or no problem of unregulated competition today. The highway vehicle and the railway train ought to be partners—not competitors. That they are not, is due to each attempting to perform the other's job, and with inferior equipment for that job. It is time for railroad statesmanship to realize that trucks are a godsend and not a visitation of the devil, and to co-ordinate highways and railways into an integrated land transportation system.

Our analysis of terminal operations is not yet completed. However, the indications are that a large part of terminal time would be eliminated by the partial, and in some cases, by complete motorization of the terminal. Prerequisite thereto, however, is the development of railway car bodies which are quickly and cheaply interchangeable between the chassis of rail and highway vehicles. These bodies are no idle dream. Several types have been in practical commercial operation on some of our railways for several years. *The seventh specification, therefore, is speedy interchangeability with highway equipment.*

Accessibility

In the replies to an inquiry addressed to some 20,000 large carload shippers, we were impressed by two things: first, the cost which the shipper pays for transportation over and above the railroad freight charges; and second, the small number of shippers who kept account of these costs. The elements involved are packing, crating, loading, dunnage and transfer to the railhead either by truck or by cars from industrial sidetracks. In many cases, the aggregate cost of these elements exceeds the rail charges. *Our new freight cars must cut drastically these extra transport costs.* Expensive crating and packing is due in part to lack of shock-proofing, and also in part to the failure to construct the car of such material and in such a manner that it can be made clean and suitable for all commodities at all times.

Our car designers have overlooked the importance of facility in loading and unloading. Compare the cost in time and money of loading or unloading lumber or sheet metal into or from a box car, a plank or a sheet at a time, with that of the same operation with respect to packages of several hundred planks or sheets through the roof of the car by the use of cranes. The steamship companies are doing this in America, but the railway companies are doing it in Sweden, South Africa and the Argentine by means of freight cars with movable roofs. Some of the car bodies which have been mentioned are now equipped with removable tops. The same economies are obtainable with any commodity subject to crane handling, such as sugar, cement, pulp, brick, paper, cotton, glass, carpets, etc. *The eighth specification is accessibility*

Mobility

The question of mobility is of vital importance to economical rail transportation from another standpoint. In analyzing the nation's entire loaded car movement of 1932 our preliminary figures indicate that less than 15 per cent of the cars terminate on team tracks. Now this can mean but one thing—a large amount of traffic which formerly moved by rail is now moving by highway because of the cost of getting the goods to and from the railhead. Consider for a moment the kind of industries which do not enjoy sidetrack facilities, and you will doubtless reach the conclusion that the goods which these industries ship and receive come close to constituting the cream of our traffic. If the railroad is to recapture the portion of this business which it ought to handle from an economic standpoint it must provide ways and means of eliminating this handicap.

Illustrations of the need of a mobile car body which will eliminate transfers are found in the case of coal where deliveries can be made from mine to consumer without rehandling. That there is no small demand for

(*Continued on page 920*)

T. & T. Section Meets in Chicago

Record attendance at three-day session brings out important discussion on communication facilities

ACTIVE discussion of reports and papers on railroad communication equipment featured the sixteenth annual convention of the Telegraph and Telephone Section of the American Railway Association at the Stevens Hotel in Chicago, June 12, 13 and 14, under the leadership of C. A. Plumly, superintendent of telegraph, Baltimore & Ohio. The attendance totaled 195 members and 123 visitors, the record for the section.

Addresses a Feature of the Meeting

At the opening of the session on Thursday, addresses were presented by S. T. Bledsoe, president and chairman of the Atchison, Topeka & Santa Fe, and R. B. White, president of the Western Union Telegraph Company. Mr. Bledsoe expressed the opinion that the public expects better service from the railroads now than ever before. He stated that in complaints the public usually criticizes the executives of the railroads, whereas in many instances the employees and supervisory officers are directly responsible for the laxity in service being criticized. He expressed confidence in the ability of the members of the Telegraph and Telephone Section to meet the more exacting requirements of the public, by providing satisfactory communication, and asked for co-operation in meeting this responsibility.

In introducing the next speaker, Chairman Plumly explained that Mr. White had grown up on the Baltimore & Ohio, having started as an agent and later serving as dispatcher, division superintendent, and operating executive, going with the Western Union about a year ago.

After this introduction Mr. White brought out the strong mutual interest between the railroads and the company he represents. He explained that the use of telegraph, as a means of communication, would not only continue in spite of other competition but would increase in its usefulness. For example, in spite of the growth of telephone service during the past decade, the use of commercial telegraph was the greatest in history although reductions in the use of telegraph are readily apparent in towns of medium size where the business is handled by the railroad agent or operator. He accounted for this trend by the fact that the hours of the station forces have been reduced, and, the further fact that on account of other changes, the railroad station is no longer the center of business of a community. As a result, the generation now growing up has acquired new habits in the use of communication facilities. He explained that it is to the advantage of the railroads, as well as the commercial telegraph companies, to devise means of regaining this business by informing the public of the advantages of the telegraph as a means of transmitting written messages. A large part of the telegraph traffic, he explained, is now handled by new methods which contribute to the reliability, speed and accuracy of the service.

During the afternoon session on Tuesday, two papers were presented dealing with inductive interference, both being illustrated by pictures and models of power and communication lines. The first paper, entitled Low Frequency Power Induction and Its Effect on D-C. Telegraph Operation, was prepared by L. M. Jones, A. J. Hanks and C. M. Brown of the Western Union Telegraph Company, while a paper, entitled Low Frequency Induction Between Power and Telephone Circuits, was presented by H. R. Huntley of the American Telephone & Telegraph Company. These papers were followed by extensive discussion by representatives of various railroads, including the Pennsylvania and the Canadian National, who explained the use of special equipment to reduce the inductive effects of power lines on communication equipment. On certain territory between Montreal and Toronto where power lines parallel the communication lines, surges in the power circuits would ground the arresters in the communication equipment, thus causing numerous interruptions of services for hours at a time. As a result of an extensive study, a new relay-arrester was developed which automatically

The Attendance at the Sixteenth Annual Convention of the Telegraph and Telephone Section, A. R. A.

protects the arresters from the surges. Incidentally the power company paid for the new relay-arresters.

On Wednesday afternoon Dr. R. H. Colley, of the Bell Telephone Laboratories, Inc., explained the new wood-pole specifications of the American Standards Association, pointing out certain advantages of wide adoption of this standard as a means of reducing pole costs and securing better poles. For example, he advocated that, as a means of simplifying the production of poles in small quantities, they should be ordered without requiring that the holes be bored and grain cut before they were subjected to preservative treatment. Such a procedure would permit producers to proceed in orderly fashion to cut, season and treat poles, and have them available for shipment on short notice. He claimed that the decay of wood near the bolt hole or grain would not be a factor in the life of the pole, because failure would come at the ground line first. This statement was based on the assumption that the treatment was complete in the sap wood.

Next on the program was a paper entitled The Application of Printer Telegraph to Railroad Service, by A. S. Benjamin, sales engineer, Teletype Company, and C. O. Overbey, telegraph engineer, Atchison, Topeka & Santa Fe. An interesting part of the paper was devoted to an explanation of the use of printers on the Missouri Pacific for transmitting reports on the consist of freight trains. With these advance reports, the yardmaster at the arriving terminal has a chance to plan the switching of a train prior to its arrival, which not only reduces yard delays but "irons" out the peak of work in the yard office. Copies of the reports are used for "wheel reports" for the car accountant, and as "passing reports" for tracing loaded cars in transit.

The program of the convention also included the reports of 11 standing committees, of which those on Economics, Message Traffic, Education and Train Communication are summarized here briefly. The remainder of the reports dealt with detail specifications of communication facilities.

Reports on Economics and Message Traffic

The Committee on Economics presented a report explaining savings possible by changes and improvements in communication facilities, the information having been assembled by a questionnaire. For example, 36 roads reduced the expense for leased telephone facilities and services to the extent of $540,724 annually for the past three years. Fifteen roads reported the substitution of rectifiers for other sources of energy, effecting total savings of $13,603 annually. Four roads have installed tube conveyor systems which effect an annual saving of $8,839. On 34 roads, dispatchers' districts have been consolidated or extended so that 510 districts have been reduced to 343. The changes in communication facilities which made it practicable to make these consolidations played an important part in effecting the total annual saving of $1,569,190 for the past three years.

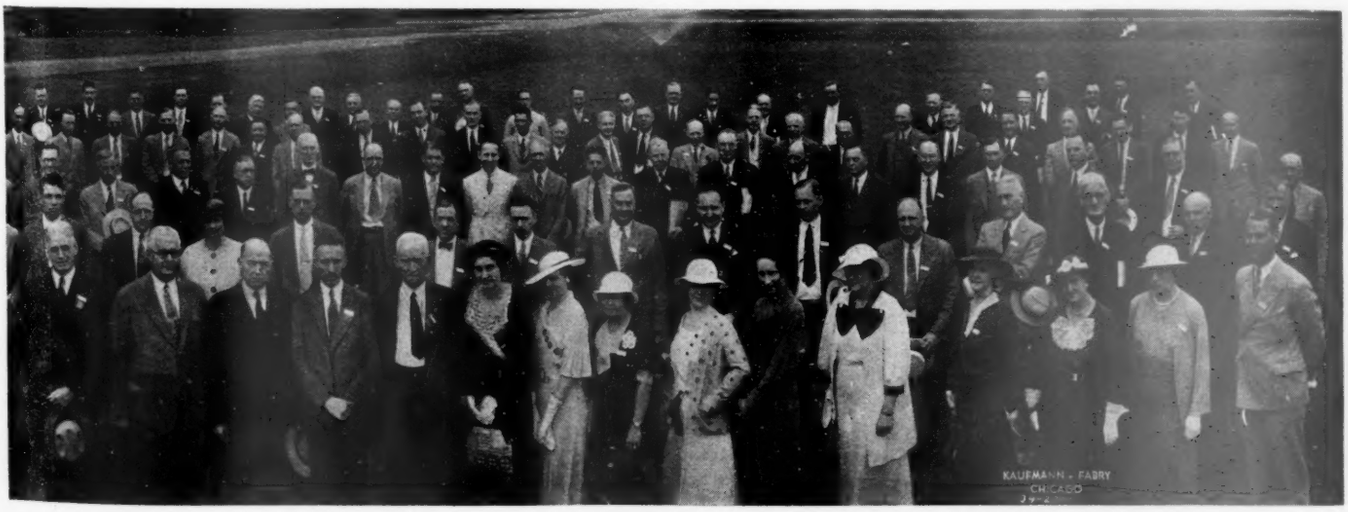
The report of the Committee on Message Traffic explained ways and means of expediting railroad communication service. For example, the Missouri Pacific is using a system of schedules for the intermittent working of telegraph circuits, which results in a uniform distribution of the message load, thus giving better service and greater wire capacity. Several other roads, such as the Baltimore & Ohio, the Seaboard Air Line and the Louisville & Nashville are using this system, while others such as the New York Central, have not as yet adopted it.

The report also included a diagram and explanation of an efficient procedure for centralizing car tracing. The practice of representatives wiring superintendents and yardmasters at various terminals promiscuously results in a large number of unnecessary telegrams. Car tracing should be confined to one bureau on each railroad and all inquiries should be addressed to that bureau. Tracers should not be sent until manifest or passing reports have been scrutinized, and it is found that the car is not shown thereon. Generally when it is necessary to trace, cars can be located by addressing one message to a particular point instead of addressing various points along the route. Further tracing should not be done until a reply has been received from the point addressed.

Before using certain kinds of standard report forms on teletype printers, it was necessary to have new forms prepared, based on uniform letter and line spacing standard on teletype machines. As this is the same spacing as used on standard typewriters, a great saving has been effected for the use of these new forms on typewriters, because it is not necessary for the typist to shift the paper to make entries in the proper space.

Head-End to Rear-End Train Communication

The report of the committee on radio and wire carrier systems included explanations of two systems of head-end to rear-end communications for freight trains. The General Electric Company's inductive system was explained on page 801 of the *Railway Age* for June 3, 1933, and the Westinghouse Electric & Manufacturing Com-



Totaled 195 Members and 123 Visitors Which was the Record for Any Meeting of This Organization

pany's radio system, as tested on the N.Y.,N.H.&H., was explained on page 376 of the *Railway Age* for March 17, 1934. Further tests and developments are under way at the present time and several members present expressed the opinion that there is a definite need for train communication as soon as practicable equipment can be made available at a reasonable cost. The report also explained the use of a train communication system for directing the operations of a locomotive being used to push cars over a hump in a classification yard. When a yardmaster or hump conductor can speak directly to the engineman, special information can be given as to when to increase or reduce speed, the result being to expedite the operation considerably.

The Committee on the Education and Training of Employees submitted two sets of questions and answers to be used in determining the qualifications of telephone maintainers, and for the maintenance of various types of polar relays. The Committee on Fire Protection and First Aid presented a plan for educating and training the supervisory forces and employees in accident prevention.

At the close of the session, the election of officers for the coming year was announced as follows: Chairman, A. W. Flanagan, superintendent of telegraph, Southern Pacific; first vice-chairman, H. C. Chase, superintendent of telegraph, Atchison, Topeka & Santa Fe; and second vice-chairman, W. A. Jackson, superintendent of telegraph, New York Central Lines. W. A. Fairbanks continues as chairman of the Section.

The Freight Car of the Future

(*Continued from page 917*)

this service is evidenced by the fact that at such large industrial centers as Pittsburgh and St. Louis over half of the coal is now moved in by truck. A mobile body to save rehandling is also indicated in the case of bulk construction materials—sand, gravel, cement, stone; in farm products—grain, fruits, vegetables, live stock, all of which are leaving the rails partly because of this excess transfer cost. The mobile body will extend your transportation service to the door of the patron where you will meet on equal terms your highway competitor. *The ninth specification is mobility.*

Utility

Our car service study indicates that 57 per cent of the time of a loaded car was spent in the possession of the patron while being loaded and unloaded. Largely due to this fact the utility of the freight car is pitifully low. The average car moves about 10,000 miles per annum. Even in the peak years, such as 1928 and 1929, it was less than 12,000 miles. This means you get less than 30 miles per day. Highway common carrier trucks average over 25,000 miles per annum, including within that average, collection and delivery trucks whose mileage is necessarily much shorter. Highway common carrier averages of over 75,000 miles are not infrequent.

The freight car consists of two parts—the body which the patron uses and the chassis which the carrier uses. In the average freight car the ratio of the chassis cost to that of the body is at least 2 to 1. The cost of interest, depreciation and repairs upon the standard car amounts to about $1.00 per day of which 65 cents is chargeable to the chassis. This all means that in order to permit the shipper to use a container which costs 35 cents per day we surrender the use of a machine which costs us $1.00 per day for two-thirds of which he has no earthly use. One-third the total daily cost of cars is dissipated in this manner.

Should we not furnish the shipper only that part of the equipment which he needs and in the meantime utilize our machine for productive purposes? This merely means that the plane of railroad transportation will be raised from the level of the track to the level of the car frame; that the car chassis will be used solely for traction and car bodies for containment. It presumes at least two sets of car bodies for each car. Even assuming no reduction in carrier terminal detention—which heaven forbid—this would mean a reduction of 50 per cent in car chassis requirements and a saving in capital and depreciation cost of 33⅓ per cent. At the same time the annual mileage of the car chassis would be doubled putting it into the same class with respect to utility as the motor truck. *The tenth specification is utility.*

Summing Up

In sum then, the ideal freight car, not of the future, not of tomorrow, but of today, is one light enough to carry five times its weight; strong enough to drag 1000 times its weight; versatile enough to handle any commodity in any weather or temperature; insulated, coolable and heatable, adaptable in size to present-day sales unit requirements, providing security for person and property; dependably speedy in terminals as well as on the road, accessible for loading and unloading from any one of its six sides; and finally attaining both mobility and utility by being quickly and cheaply transferable from rail to highway chassis vertically, longitudinally and laterally.

As I see it the American railroad is at the crossroads: it cannot stand still: To live it must press on. The grand opportunity and the great responsibility rests largely upon the shoulders of the operating personnel—two long words which being interpreted mean you gentlemen. That you will fully measure up to these responsibilities, seize and expand these opportunities is not only carved deep in the records of the industry—it is ingrained in your every bone and sinew—Gentlemen, I envy you.

* * *

National Safety Council's Class A Award Presented to Chicago & North Western

G. B. Vilas, general manager of the road, is shown receiving the award from John E. Long, president of the National Safety Council. The C. & N. W.'s record as leader in employee safety work for each of the past four years has resulted in its winning three National Safety Council plaques and one Harriman gold medal.

Labor Leaders "Beam" As Pension Bill Is Passed

Senate refuses to include competing transport agencies in measure disapproved by Eastman

WASHINGTON, D. C.

OVER the opposition of Co-ordinator Eastman, the railroads, and the National Industrial Traffic League, the railroad retirement pension bill was passed by Congress on June 16 with only one dissenting voice in the Senate and one in the House. The bill was passed by the Senate on June 14 after about an hour of discussion by a vote of 66 to 0, "with the leaders of the standard railroad labor organizations beaming down upon them from the gallery", according to "Labor", the paper published by the labor organizations.

No Vote Against Bill

Not only was no vote cast against the bill but announcements were made on behalf of 26 of the 30 Senators who were absent that if present they would have voted "yea", and Senator Metcalf, of Rhode Island, the only Senator who spoke against the bill, finally voted for it after he had unsuccessfully sought to have it amended in several particulars. In the House the bill was passed on June 15 in somewhat different form within 40 minutes under suspension of the rules, with only Representative Merritt, of Connecticut, speaking against it and expressing concern as to where the money was to come from. The bill was then sent to conference and the conference report was adopted by both houses on Saturday afternoon.

Although pension legislation was one of the subjects on the legislative program of the Railway Labor Executives' Association for this session the bill as passed, S.3231, was not their bill but was based on one advanced by the Railroad Employees' National Pension Association, known as the "Royster plan", at first condemned by the standard labor organizations as unsound but later accepted on their behalf after it had seemed to be more popular with the employees because it promised more and bigger pensions without delay. A "compromise" bill representing mainly the features of the pension association plan was introduced in the Senate by Senators Wagner and Hatfield and in the House by Representatives Keller and Crosser and the form in which it was enacted includes modifications made by the House and Senate committees, partly to meet criticisms by Co-ordinator Eastman.

Unsatisfactory to Railroads

It was passed in a form very unsatisfactory to the railroads, although perhaps not quite so much so as the earlier drafts of the bill. The railroads have sought for some years to improve their pension systems under which their pension liability is constantly increasing while no reserves are being accumulated toward meeting the increase, but the new bill proposes not only to increase the cost of maintaining a pension system by increasing the pension annuities and the number of men immediately eligible for pensions but makes no provision for establishing reserves to meet the increase, merely authorizing a government board to determine from time to time the percentage contributions to be assessed against the carriers and their employees, the railroads paying twice as much as the employees. Moreover the railroads are to be treated as a single system for this purpose and the service period on which the pensions are to be based is not limited to service for a single employer, nor even to continuous service.

The bill is supposed to provide for only an experimental plan, although no specific provision is made for its expiration. Not later than four years from its effective date the Railroad Retirement Board, in a special report to the President, is to make specific recommendations for "such changes as shall assure the adequacy and permanency of said retirement system on the basis of its experience and all information and experience then available." For this purpose the board is to make such investigations and actuarial studies as shall provide the fullest information practicable for such report and recommendations. Mr. Eastman has promised to submit his report on the subject before the next Congress. The board is also to cause to be made actuarial surveys and analyses at intervals of not more than two years.

Designed to Afford Re-Employment

The purpose as stated is not only that of "providing adequately for the satisfactory retirement of aged employees and promoting efficiency and safety in interstate transportation", but also "to make possible greater employment opportunity and more rapid advancement of employees in the service of carriers", and the act is to be "administered and construed with the intent and to the purpose of providing the greatest practicable amount of relief from unemployment and the greatest possible use of resources available for said purpose and for the payment of annuities for the relief of superannuated employees."

The plan provides for the payment of pension annuities to each employee having attained the age of 65 years or having completed a service period of 30 years. The bill requires employees to contribute 2 per cent of their compensation (excluding that in excess of $300 a month) and the railroads twice that amount to be paid into a fund in the Treasury of the United States to be administered by a Railroad Retirement Board, which is authorized to determine and change the percentage from time to time to produce the amount necessary to pay the annuities. The fund is to be invested in government obligations. Employee contributions are to be deducted by the railroad from the compensation of its employees.

The board is to consist of three members appointed by the President, subject to confirmation by the Senate, including one from recommendations by representatives of the employees, one from recommendations by the carriers, and a third to serve as chairman.

The term "employee" is defined as including each

person in the service of a carrier, "subject to its continuing authority to supervise and direct the manner of rendition of his service, who has been in such service within one year before the enactment hereof, or who after the enactment hereof shall have been in such service", and as including also each officer or other official representative of an "employee organization", who has performed service for a carrier, who is duly designated and authorized to represent employees under and in accordance with the railway labor act, and who, during or following employment by a carrier, is engaged in such representative service in behalf of such employees.

The "Service Period"

The "service period" includes total service for one or more carriers whether or not continuously performed and includes as one month every calendar month during which the employee has been paid compensation by a carrier. A year is to include every twelve such months.

The carriers whose employees are provided for in the law include not only any railroad, express company, or sleeping car company, but also any company directly or indirectly owned or controlled by or under common control with a railroad and which operates any equipment or facilities or performs any service (other than trucking service) in connection with the transportation of passengers or property or the receipt, delivery, elevation, transfer in transit, refrigeration or icing, storage, and handling of property transported by railroad and any receiver, trustee, or other individual or body, judicial or otherwise, when in possession of the business of such carrier. No provision is made, however, for employees of railroad associations.

Annuities

The section relating to annuities provides:

SEC. 3. Each employee having attained the age of 65 years, or having completed a service period of 30 years, shall be paid an annuity, to begin on a date specified in a written application, which date shall not be more than 60 days before the making of the application. No annuity shall begin less than 6 months after the effective date. Such annuity shall be based upon the service period of the employee and shall be the sum of the amounts determined by multiplying the number of years of service, not exceeding 30 years, by the following percentages of the monthly compensation: 2 percent of the first $50; 1½ percent of the next $100; and 1 percent of the compensation in excess of $150. The "monthly compensation" shall be the average of the monthly compensation paid to the employee by the carrier, except that where applicable for service before the effective date the monthly compensation shall be the average of the monthly compensation for all pay-roll periods for which the employee has received compensation from any carrier out of 8 consecutive calendar years of such services ending December 31, 1931. No part of any monthly compensation in excess of $300 shall be recognized in determining any annuity for any employee contribution. The annuity shall be reduced by one-fifteenth of such annuity for each year the employee is less than 65 years of age at the time of the first annuity payment. No such reduction shall be made if the Board shall determine that the carrier has retired the employee because of physical or mental inability to continue in active service. Upon death of an employee before or after retirement an amount, equal at his death to a computation, with interest at 3 percent compounded annually, of the accumulation from his payments less any annuity payments received by him, shall be paid as he may have designated or to his legal representative. Any employee who upon retirement shall be entitled to an annuity with a value determined by the Board of less than $300 shall be paid such value in a lump sum.

RETIREMENT

SEC. 4. Retirement shall be compulsory upon employees who, on the effective date, have attained or thereafter shall attain the age of 65 years. The carrier and the employee may, by an agreement in writing filed with the Board, extend the time for retirement as to such employee for 1 year and for successive periods of 1 year each, but not beyond the age of 70 years. Until 5 years from the effective date the compulsory retirement shall not apply to an employee who from and after the effective date occupies an official position in the service of a carrier.

EXISTING PENSION SYSTEM

The provision for existing pension systems is as follows:

SEC. 6. The board shall have the power to provide by appropriate rules and regulations for substituting the provisions for annuities and other benefits to employees under this act, for any obligation for prior service or for any existing provisions for the voluntary payment of pensions to employees subject to this act by a carrier or any employees subject to this act, so as to relieve such carrier from its obligations for age retirement benefits under its existing pension systems and to transfer such obligations to the retirement system herein established. If the fulfillment of any such transferred obligation shall require additional contributions or larger payments than would otherwise be required under the provisions of this act, then such additional contributions shall be made by the carrier originally responsible for the creation of such obligation or for the excess amount of such payments over those which would be required under the provisions of this act. In the event that the board is unable to make satisfactory arrangements with any carrier for the substitution of the provisions under this act for its existing pension system, then, and in that event, the provisions of this act shall be applied to said carrier and its employees without regard to any conflict or duplication in the operation of such an existing pension system and the operation and effect of the provisions of this act: *Provided*, That the board, at its option, shall have power, in lieu of the foregoing provisions of this section, to order that all former employees of carriers who prior to the effective date have become separated from the service at the age of 70 years or over and who may or may not be receiving age retirement benefits shall be entitled to the benefits of this act.

Cost

On its face the bill would require the railroads to contribute about $60,000,000 for the first year, on the basis of present payrolls, while the extent to which they would be relieved of existing obligations to their pensioners is left uncertain; and if more should be required to pay the annuities provided for in the bill and the expenses of administration, the percentage may be changed by the retirement board at any time. The amount required would depend largely on the number of employees who would elect to retire. This was estimated by proponents of the bill at 50,000 to 100,000, the lower figure being used to show how small the cost would be and the higher by those who were emphasizing the amount of employment to be provided for. Mr. Eastman had estimated the number eligible to retire in 1935 at 185,800 and said it was impossible to justify any other assumption than that all persons would retire in 1935 if eligible by reason of attaining the age of 65 and on this basis he estimated the retirements at 67,100. There is nothing in the law to prevent a man in his fifties from retiring with a small pension, after 30 years of service, and taking another job.

On the basis of the Senate bill Co-ordinator Eastman had estimated that annuity payments to employees retired in 1935 would amount to $91,000,000 and that pension payments under the existing railroad plans, would be $40,000,000 to $61,500,000 more, depending upon the extent to which the Railroad Retirement Board would take over the existing pension systems under the terms of the bill, and that the amounts would increase from year to year. Payments under the existing plans amounted to about $34,000,000 last year. His figures were based on a provision in the bill for annuities based on 2 per cent of the "basic wage" for each year of service but the bill was later amended to provide for a lower percentage of the basic compensation above $50 a month, which would reduce the cost somewhat.

The House bill had proposed to change the 2 per cent to 2 per cent of the first $50, 1½ per cent of the second $50, and 1 per cent of basic wage in excess of $100. The House bill also proposed a maximum annuity of

$100 a month but this was omitted from the conference bill, although the fact that the bill recognizes as a basis for an annuity only a monthly compensation up to $300 makes a maximum of $120 a month. Senator Hatfield, in presenting the conference report, said "it is believed that the amounts in the higher wage scale are insufficient to secure desirable retirements which would be of great advantage to the industry. Other changes will no doubt have to be made as experience will develop the necessity."

Amendments Proposed by Senator Metcalf

Senator Metcalf made an effort to have the bill amended in several particulars, and opposed such ill-considered legislation at this time. Only one of his amendments was adopted, however, the one reducing the "experimental" period from four years to two years, and Senator Metcalf finally voted for the bill. Later the conferees changed the period back to four years. "I feel that this proposed legislation is right in principle," he said, "and we should do something to bring about a uniform system of retirement. However, I feel that this is hurried legislation, prepared without accurate knowledge of what it will cost either the railroad or the employee, and without the benefit of a thoroughly studied plan of organization.

"It is significant that the federal co-ordinator of transportation, Mr. Eastman, has expended some $300,000 for the purpose of studying a retirement system for the railroads. Preliminary studies have been made but Mr. Eastman has had no opportunity to make a summary of his findings and report to the Congress. It has not been possible for the proponents of the bill to prepare an accurate actuarial, for such an actuarial would cost not less than half a million dollars and would take many months to prepare. Co-ordinator Eastman appeared before both the Senate and House committees and opposed this bill on the ground that it was premature. He agrees with me and with members of the committee that such legislation is desirable, but he feels, as I feel, that a pension system which is ill-advised and not carefully constructed will endanger the possibility of a well-rounded, permanent, and secure system.

"We should not risk a system which might fall down from its own top-heaviness, but we should start conservatively by allowing the board to make its studies, instal a widespread and conservative system, and report to the Congress as soon as possible, in order that we might redraft legislation for a permanent, satisfactory system. We should start out with a pension system which would pay retired employees 1½ per cent per year of their average pay instead of 2 per cent, and then increase this, should it become necessary, in the next Congress. This would assure the railroads and the employees that the assessments which will be necessary to cover the cost of this bill will not be greatly increased during this experimental period and will lessen the danger of our building up a top-heavy system. I feel that two years will be sufficient for this experimental period.

Why Not Pensions for Truck Employees?

"I also feel that this system should be extended beyond the railroads, to include all common carriers. It would seem inconsistent for the Congress to authorize a retirement system for the railroads and ignore the employees of their competitors. The persons who engage in bus and water transportation are engaged in equally hazardous occupations, and in occupations which are in the interest of the general welfare.

"While I feel, as Co-ordinator Eastman feels, that we should wait another six months until we have complete actuarials, so that the matter of cost to both employees and railroads might be accurately determined, I am so heartily in sympathy with the principle of pensions that I am going to content myself by offering what I believe to be perfecting amendments to the bill."

By way of reply to statements by several Senators who have been especially active in pushing the legislation that no one was opposed to the bill, some of them even indicating that the railroads were for it, Senator Metcalf presented telegrams he had received in reply to his request for their views from C. R. Gray, president of the Union Pacific; Daniel Willard, president of the Baltimore & Ohio; F. E. Williamson, president of the New York Central; W. R. Cole, president of the Louisville & Nashville, and S. T. Bledsoe, president of the Atchison, Topeka & Santa Fe. All expressed opposition to the bill, both because of the heavy burden it would impose on the railroads at this time and because of the unsound basis for the legislation, providing for pension payments in excess of the proposed contributions.

Mr. Gray also made the point that the President has advised Congress that he expects to present a study and recommendation of a somewhat similar nature with respect to all industries and supported by actuarial studies. "It would be most unfortunate," he said, "to have one branch of industry now singled out and without sufficient information subjected to arbitrary treatment upon a basis which might prove exceedingly embarrassing by comparison when the whole subject of industrial annuities is considered." He earnestly urged that Congress delay any action until it can have advantage of Mr. Eastman's report.

Mr. Bledsoe said that, while the bill by its own terms is a four-year experiment, it makes definite promises of pensions to be paid at the expiration of many years so that it will be impossible to abandon the experiment or make substantial change in it after compelling the railroads and employees to contribute to it for four years, "or if it be found possible abandon or change experiment disappointment and injustice resulting to employees would cause disturbance of relationships which would be injurious not only to railroads and employees but to public as well."

Mr. Bledsoe also pointed out that the bill was on a "pay-as-you-go" basis, which means, he said, that the employee compelled to contribute creates no fund to which he may look for his own protection, but in exchange for his money receives only a promise that others in years hence will furnish money for his pension when he reaches pension age. The bill provides for immediate compulsory retirement of large numbers who will contribute nothing or very small amounts but who will receive pensions for the remainder of their lives on the same basis as men who continue contributions over long periods of years, he said. Mr. Williamson said the passage of the bill would be "devastating to the railroad industry" and that legislation that would tax the railroads beyond endurance "is neither timely, constructive, nor in the public interest."

Senator Metcalf's first amendment, to apply the terms of the bill to employees of other transportation companies, aroused such opposition among the Senators who have been urging the bill that he withdrew it. His amendment to reduce the experimental period was accepted. Other amendments rejected were to exclude employees or officers of labor organizations, to advance the age limit to 70 years, with an exception for officials, and to reduce the contributions to 1½ per cent for employees and twice that amount for the railroads.

Railway Labor Act Amendments Passed

WASHINGTON, D. C.

THE bill proposed by the Railway Labor Executives' Association to amend the railway labor act of 1926, providing for the establishment of a National Railroad Board of Adjustment and a new National Mediation Board to take the place of the present United States Board of Mediation and offering to railroad employees complete freedom to join a standard railroad labor organization without influence from the companies, was passed by Congress on June 18, shortly before the adjournment, after a long wrangle in the Senate which had helped to break up the plan for an adjournment on Saturday night. The bill was passed mainly in the form in which it had been recommended by Co-ordinator Eastman, who had submitted a revision of the original bill, although numerous amendments were made in the Senate. The House, which had passed the bill on June 15 with several amendments urged by the labor organizations relating to "company unions" which were vigorously opposed by Mr. Eastman, finally accepted the Senate text of the bill.

Final passage of the bill in the Senate was accomplished only after a bitter argument aroused by a filibuster conducted by Senator Hastings, of Delaware. There was no record vote on the bill but Senators Hastings and Norbeck were the only ones to vote against a motion to take up the bill, while 78 voted for the motion. Chairman Dill, of the committee on interstate commerce, tried to force passage of the bill on Saturday night by telling the Senate, just after the passage of the pension bill, that there had been "no legislation for the railroad laboring men of the country" and that he had been told by representatives of the railroad labor organizations "that if there is not such legislation as this a strike vote will be called among the railroad employees of the country."

The bill was not on the program of legislation which the President and the leaders had tentatively agreed upon as necessary before adjournment and Senator Hastings said it had been understood that it was not to come up, but Senators Wheeler and La Follette, backed also by Senator Couzens, insisted against adjournment until it was passed and Senator Dill also joined in the insistence after the plan for adjournment Saturday night had been upset. At the opening of the session on Monday Senator Robinson said he had consulted with the President about it and with a large number of Senators. "It is felt by those with whom I have consulted," he said, "that if the measure could have been brought forward a little earlier in the session, it might have been disposed of without undue delay; but the President thinks, and I concur in that statement, that if the measure is to be taken up and indefinitely discussed, it had better go over until the next session. It is not of an emergent nature."

Senator Hastings said he was not filibustering against the bill but he served notice on the Senate that he did not propose that Congress should adjourn Saturday night and at the same time pass the railroad bill without adequate consideration. Several assertions were made during the debate that the President wanted the bill passed but Senator Robinson, the Democratic leader, said that if there were to be an unlimited and indefinite filibuster it was the feeling of the President and of himself that the bill might go over until the next session.

Senator Couzens, Saturday night, told the Senate that the bill was being opposed by one railroad, and that he knew of "no particular objection except from the Pennsylvania Railroad," which he said had practically written Senator Hastings' minority report against the bill. On Monday night, however, Senator Hastings read telegrams from 25 railroad executives expressing opposition to the bill and R. V. Fletcher, general counsel of the Association of Railway Executives, sent Senator Couzens a letter saying he was in a position to say definitely that "the railroads of the country represented by this association and by the Short Line Railroad Association are unanimous in their opposition to this bill."

Most of the telegrams from the railroad executives emphasized the point that the provisions of the bill would tend to disrupt existing satisfactory relations that have long existed between their managements and the employees, and several urged that a further opportunity be allowed to work out a mutually satisfactory bill.

Eastman's Point of View

Senator Dill then produced a letter from Co-ordinator Eastman to the President, dated June 14, urging "that the leaders in both the Senate and the House be requested to take the necessary action to make sure that these two particular bills, S.3266 and H.R.9869, be not permitted to go by default and that all possible be done to bring about their enactment." He described the bills as intended to clear up ambiguities in the railway labor act, "provide definite means of representation of employees with penalties to insure management from interference in the election of representatives, and provide for compulsory adjustment of individual grievances."

He said that the House bill contained some differences but that they were not too great for a prospect of harmonizing them in conference. "If the proposed amendments are not enacted," he said, "so as to provide an orderly system of elections under the auspices of the United States Board of Mediation to decide the issue of representation, a host of strike threats and other labor difficulties will arise this summer, demanding Presidential intervention. Similarly, difficulties are also likely to result because of the unavailability of adequate grievance adjustment machinery as proposed by the amendments." If the bills were passed, he said, "it will not only forestall almost certain railroad labor difficulties in the near future but will progressively improve railroad labor relations, thus furnishing a worthy object lesson to other industry."

In the House the bill was opposed only by Representative Merritt, of Connecticut, although there was no record vote.

Senator Wheeler, of Montana, endeavored to have the Senate bill amended by inserting provisions which the labor organizations had originally proposed and which had been included in the House bill, making the prohibition against influence by a railroad apply only in the case of a "company union," where Mr. Eastman had used the word "labor organization," but the amendments were rejected. Senator Hastings called attention to the letter written by A. F. Whitney, president of the Brotherhood of Railroad Trainmen, opposing Mr. Eastman's language in several places on the ground that it would interfere with the Brotherhood's percentage contracts.

Senator Dill objected to the Wheeler amendments, saying: "What the committee objected to, and the position I have taken representing the committee, is that if we are, by law, to say that the railroads shall not be permitted to require employees to join a company union the railroad men should not, by law, be permitted to compel or require a man to join some other union that the

(*Continued on page 932*)

Box-Car Designs Tested by A. R. A.

By use of extensometers and deflectometers the Car Construction Committee of the Mechanical Division investigates stresses in box cars of three designs

AN important and extensive research of the stresses and deflections imposed by static and dynamic loads on all important detail members of three designs of box car has been completed by the Car Construction Committee and a report with numerous charts has been submitted to the Mechanical Division. No similar experimental research of such completeness has ever been attempted. Before such an investigation could be undertaken it was necessary to develop not only the means to be used in conducting the tests, but also the test instruments themselves. The data obtained through this research add much to the knowledge of the fundamentals of equipment design. Abstracts from the report follow.

Car Designs Tested

The following box cars of three well-known designs were selected for test:

(1) A.R.A. Standard Design.—This is a steel-sheathed wood-lined box car of 50 tons nominal capacity submitted in 1932 and illustrated and described in A.R.A. Circular DV-768.*

The program under which this car was created had as its object the production of a design representing the latest state of the art in reference to weight, cost, construction, strength, distribution and utilization of materials employed and general utility, so that when completed the car would be too attractive for railroads to disregard and would be of such character that any road might adopt it as standard and construct thereto its future equipment of this type.

The design was developed so as to provide adequate strength and dependability for general interchange service and approximately 3,500 lb. of weight were saved in the car body as compared with existing constructions of equivalent size, capacity and type.

*See the Railway Age July 9, 1932, page 47 for description and drawings.

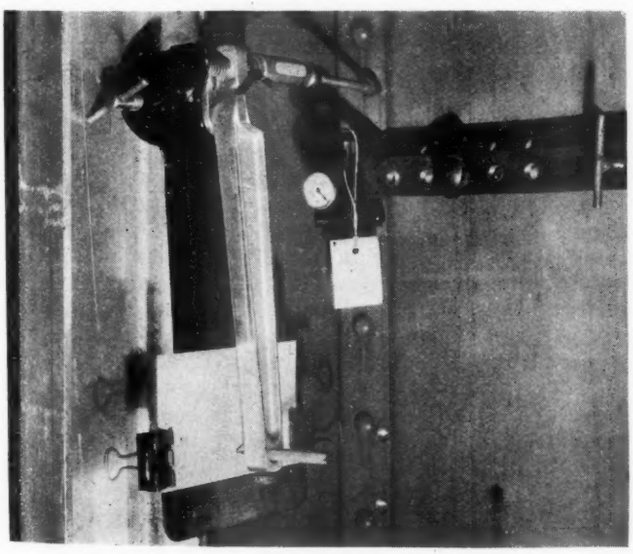


Fig. 1—Extensometer (Right) and Deflectometer (Left) Mounted on the Car Body

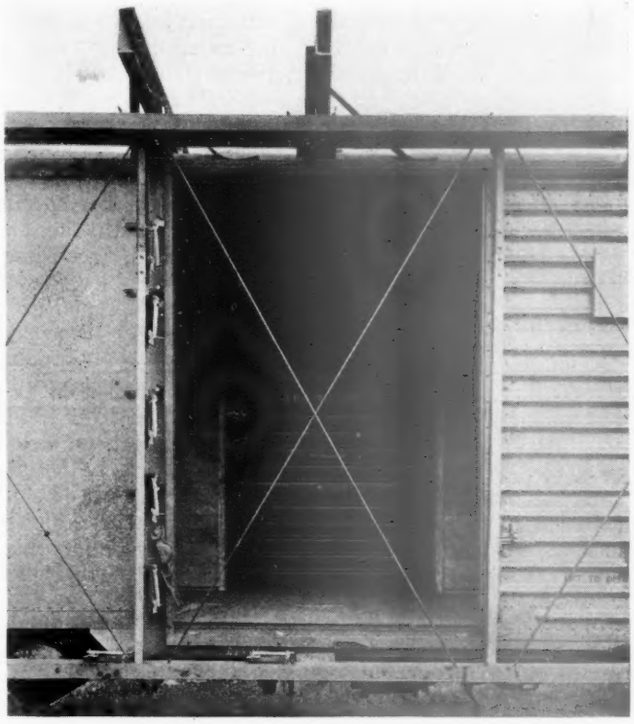


Fig. 2—Framework and Instruments for Testing Door Side Posts

No alloy steels or integrally welded constructions were used except for the welded center-sill seam, but the belief was expressed that in the not far distant future both these deviations from present general construction practice might be expected to provide further practical means of reducing weight. During the past year or two steel manufacturers, through requests from and co-operation with certain car builders and manufacturers, have made definite progress which apparently is about to result in quantity production at non-prohibitive prices of certain alloy steels having improved properties suitable for use in the construction of still lighter freight cars. This subject is now receiving active study with a view to early constructive action if found practicable.

(2) Tentative A.R.A. Design.—This was first submitted in 1923, being illustrated and described in A.R.A. circular DV-286. The car used for test was built in October, 1929, according to these drawings.

(3) U.S.R.A. Design.—This was produced in 1919 and a considerable number of cars were constructed for a number of roads. The car used for test was built in 1929.

Reasons for and Objects of the Tests

Five sample A.R.A. standard cars having been completed in September, 1933, it became highly desirable to

ascertain the extent to which the objectives of the design had been attained; also, to make comparisons with the two significant earlier designs as a check.

Investigation by means of extensometers and deflectometers of strength and deflection characteristics present in various forms of structures is not new, but this method of testing previously had not been utilized for complete car structures. About two years previous to the completion of these cars the Pullman Car & Manufacturing Corporation had developed the technique required to a point where its engineering department was in position to conduct actual research by this method.

The first specific object of this work was to check the new design and to obtain information for use later in the advancement of the art from the records thus made available of the stresses and deflections in all stress members of the car body under static and dynamic (live) load conditions. The latter were intended to approximate the effects of movements at high speeds over average trackage and road bed. A further specific object was to make direct comparison with the two earlier significant designs of steel-sheathed, wood-lined box cars.

Method of Conducting Tests

The extensometer used in this work was made by the Tinius Olsen Company and is the smaller of two instruments equipped with a dial shown in Fig. 1. In the instrument itself one leg is fixed and the other is movable, both pointers being set in accurately formed conical holes provided for the purpose. Stretch or compression in a 2-in. flat surface of the metal to which it is attached is indicated on the dial and may be identified either as tension or compression through the direction of rotation of the pointer.

The instruments are held to the car structure by means of brackets in such position that the two spacing members are free to move in either direction, and the movement of the sheet is indicated on the dial so long as the stretch is below the yield point. The amount of movement is very slight and is a function of the modulus of elasticity of the material. Each dial graduation corresponds to a nominal stress of 1,000 lb. per sq. in.

The deflectometer, the larger instrument shown at the left in Fig. 1, was developed and built by Pullman. In effect, the deflectometer is a bell crank with dampened movement, the ratio of actual deflection magnification being about 8 to 1.

Naturally, the deflectometer must be mounted on and rigidly clamped to a framework supported independently from the portions of the structure in which deflections are to be measured. This was accomplished by using the construction at the ends of the body bolsters as supporting points for the framework, which consisted of aluminum rolled channel sections and diagonal brace rods. The photographs, Figs. 2, 3 and 4, clearly illustrate the framework arrangement and application.

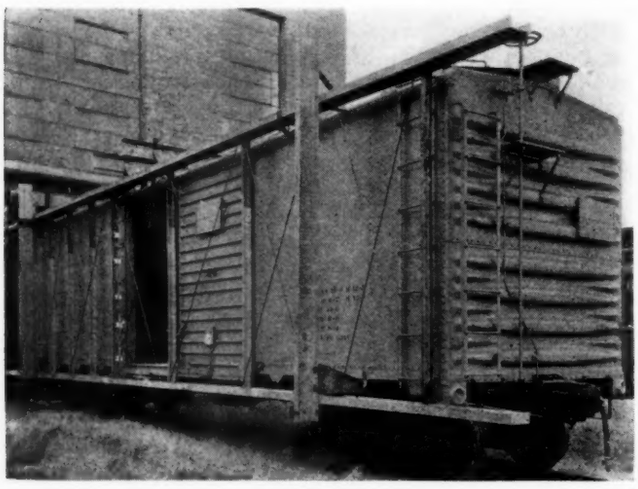


Fig. 3—General View of a Car with Framework for Test Instruments

After mounting each instrument the pencil is brought into contact with the recording chart and a datum line is drawn before lading is applied. Deflection under static load is recorded on one side and under dynamic (live) load on both sides of the datum line. Only maximum readings are used, as the corresponding maximum deflections only are of interest.

Under static load conditions the supporting framework does not introduce any element of error, but under live load the inertia and deflection of this framework must carefully be accounted for. Consequently, tests are first made of the supporting framework only so as to determine the deflections caused by the dynamic (live) weight of the framework alone. The live-load readings for the car structure are then corrected accordingly. During the tests both deflectometers and extensometers are mounted so as to obtain readings at practically identical points throughout the structure under investigation.

All essential stress members or members which might under any condition be subjected to stresses of consequence—center sills, body bolsters, cross-bearers, end sills, roof carlines, side plates and sills, also door and side posts—were investigated for all three significant designs by taking readings at various points in these members and it was the effort under all conditions ultimately to obtain the effects of the maximum permissible loading within the car and this was worked up by progressive steps as follows.

The light-weight of the car was first obtained and the difference between this and the total permissible weight on the rail, 169,000 lb. for the cars investigated, was taken as the maximum amount of lading to be placed in the car. The loads were uniformly distributed over the floor in the form of bags of sand each weighing 100 lb., together with bags of sawdust weighing somewhat less in order to increase the depth of the lading and were applied in progressive steps—one-fourth, one-half, three-quarters and full load. Readings were taken under each of these conditions and the resulting records permitted static line curves to be plotted for deflection and stress readings.

Under dynamic or live-load conditions accurate readings cannot be obtained with the extensometer as it is an indicating device and, consequently, its inertia renders readings unsatisfactory. This does not apply to the deflectometer, as accurate readings therewith can be recorded under dynamic loads and these represent positively the deflections which are in strict proportion to the stresses occurring in the structure up to approximately the yield point of the material; therefore, the deflectometer was relied upon to obtain data showing the stresses under live-load conditions. Having thus obtained extensometer readings for the four increments of static loading and also having recorded the deflections of the various parts of the car body for the same conditions, a ratio was established between deflection and stress which naturally held good for live loads as well.

Live Load Stresses

Deflection readings under dynamic loadings were taken for the same points as covered by the extensometer for each loading. The vertical impact or drop was

obtained by placing wedge blocks on the rails in front of the car, located one on each rail approximately 2 in. apart longitudinally. The car was then slowly pulled over these blocks, thus producing first an impact on one side and then on the other, which not only caused a straight impact, but a rolling effect as well. The latter may be likened to the rail-joint condition.

The heights of the wedge blocks progressively used were ½ in., 1 in., 1½ in., 2 in. and 2½ in., purposely graduated so as to provide equal height increments. The maximum height was arrived at after many tests had been made of other cars. These had indicated that distortion of car structures under this condition was in excess of any distortion occurring in service on the road.

The records thus obtained made it possible to plot deflections for the various degrees of live loading. The static stress curves were then extended to cover the live or dynamic load conditions, using for this purpose the established stresses proportionately between the two curves. In this manner were obtained the stress readings for the maximum dynamic load conditions which, so far as is known, may be anticipated under all dynamic load forces other than those occurring as the result of buffing or end forces.

Changes Made in A. R. A. Standard Design

From the knowledge gained during these tests it was found practicable, by making a few minor changes in the design of the new standard car "as built" to improve the structure by reducing somewhat the higher stresses found through better distribution of the materials used. While these higher stresses, even under the most severe conditions, are well within the yield point of the material and, therefore, provide adequate factor of safety, obviously it was desirable to investigate the causes of any sharp reversals or sudden changes of stresses and to improve the new design accordingly.

These changes, briefly, consist of (a) change in the top rear portion of the bolster center filler casting; (b) change in reinforcement at the side sill under the door opening; (c) application of pressed pan-shaped fillers between the center-sill members in line with the cross-bearer diaphragms, and (d) increase in the width of the bolster top and bottom cover plates.

General Conclusions Based on Test Results

Careful study of the readings and comparison of the stresses and deflections in the A. R. A. standard car-body structure with those found in the two earlier designs tested indicates that the new car is stressed lower and more uniformly in its essential members than either of the other two, even though for equivalent size and capacity it is some 3,500 lb. lighter and some of its sections are smaller.

Furthermore, localization of stresses generally prevalent in other previous car structures have been eliminated and the action of the new body design under test has given definite indication that any loads applied thereto will not bear unduly at any one point within the structure, but will produce relatively smooth, well distributed stress conditions which should be reflected in terms of satisfactory service life and maintenance costs.

Impact Tests

At the conclusion of the deflectometer and extensometer tests the same three designs of box cars were subjected to a series of severe impact tests, during which 37 impacts were made with two cars of the new design, on one of which the stress and deflection tests had previously been made. All but two or three of the impacts were "over-solid" blows made at speeds ranging from approximately 6 m.p.h. to a maximum of 18.3 m.p.h. under full axle loading. For the new design only, the tests also included a series of runs within the higher speed range made to investigate the performance of the center-sill member on the struck car under dynamic column action. To accomplish this the struck car was positioned at the head of a string of six other steel box cars.

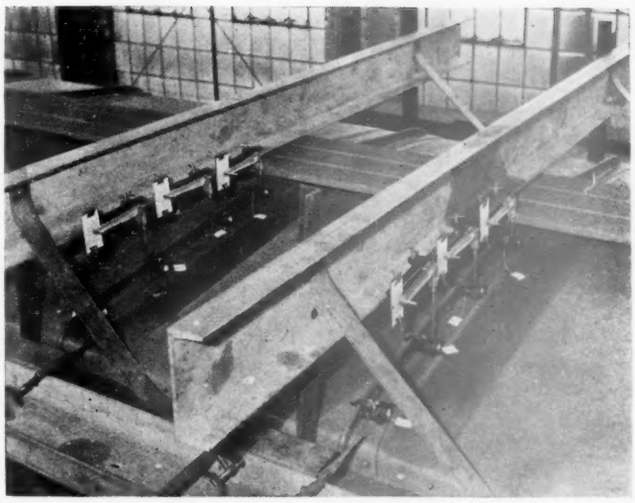


Fig. 4—Top View Showing Framework and Instruments as Mounted for Testing Roof Carlines

The results of these extremely severe impact tests, although carried well beyond collision conditions under the full axle loads used, did not indicate the necessity or advisability of making any further changes in the new design. The center sills, including draft sills of the new car, as well as the sills of the two older designs, showed no evidence of distress, distortion or failure of any kind at the conclusion of the impact tests.

Price Fixing Eliminated from Locomotive Appliance Code

On page 845 of the June 9, 1934, *Railway Age*, in an article entitled "N.R.A. Codes for Equipment and Appliances," under a sub-heading, "Locomotive Appliances Industry," is a brief description of the code proposed by the Locomotive Appliance Institute and adopted on June 5, in which appears the following statement: "The code requires the establishment of a unit cost accounting system and open price lists and the code authority is empowered to establish a lowest reasonable cost for the industry in the event of emergencies due to destructive price cutting."

This provision, which was in a preliminary draft of the code, and was included in the N.R.A. announcement, was eliminated at the instance of the Locomotive Appliance Institute before the code was approved by Administrator Johnson on June 5. The only reference to prices in the code as finally adopted and in effect since June 16 is in Article VI—Unfair Practices, which reads as follows: "(3) It shall be an unfair practice in the sub-division [the locomotive appliance industry] to engage in destructive price cutting." There is nothing whatever in the code pertaining to price fixing.

Motor Transport Section

Co-ordination Succeeds in West Virginia

Baltimore & Ohio subsidiary co-operates with private coach lines

THE Baltimore & Ohio highway subsidiary, the West Virginia Transportation Company, operates motor coach service in West Virginia over 640 miles of routes. This highway service was inaugurated to supplant unprofitable steam train operation and is also closely co-ordinated with the passenger train service of the parent company.

Despite the fact that this service was established at approximately the beginning of the depression, and that a relatively thinly populated and, under present economic conditions, poverty-stricken section of the country is served, the West Virginia Transportation Company has succeeded in making reductions in its operating expenses to more than meet the reduced revenues. This has been accomplished by the first principle of efficient motor coach operation, namely, the watching of every item of expense, and also by eliminating competition and with it duplicate expense in connection with two bus routes where private competition existed.

The West Virginia Transportation Company's revenues decreased approximately 9 per cent in 1933, as compared with the preceding year, but by making rearrangements in its service, by co-operation with competing motor coach companies and by watching all expenses, this decrease was more than made up for by a decrease in operating expenses for the same period, amounting to 15 per cent.

Separate Operations Unprofitable

Highway motor coach service between Clarksburg, W. Va., and Charleston, a distance of 162 miles, with a running time of 5 hr., was available by two routes; one route operated by the West Virginia Transportation Company via Weston, Sutton, and Clendenin, largely along the Elk river, and the other route operated by the Atlantic Greyhound Lines via Weston, Spencer and Clendenin. These services operated through a relatively thinly populated region, and, although a considerable business was available at both terminals, it was not really sufficient to make the operation profitable.

Service was also provided by the same two companies between Wheeling, W. Va., and Parkersburg, a distance of 92 miles, with a running time of 3 hr., both routes following the Ohio river; the route operated by the West

Passengers May Use Either the B. & O. Subsidiary or the Independent Line

Type of Coach Used in Co-ordinated Service

Virginia Transportation Company followed the east side of the river and was confined to the state of West Virginia, while the Atlantic Greyhound route was along the west side of the river, entirely within the state of Ohio, except at Wheeling and Parkersburg where the coaches crossed the river upon leaving and entering each terminal. These routes, together with others operated by the West Virginia Transportation Company, are shown on the accompanying map.

On both of these routes, competition for the most remunerative business, that is to say, for passengers traveling from terminal to terminal, was for several years extremely acute and was responsible for the two companies both operating trips over their respective routes, Clarksburg-Charleston and Wheeling-Parkersburg, on approximately the same departure time. At this time, separate terminal facilities and ticket offices were maintained by both companies in Charleston and in Parkersburg.

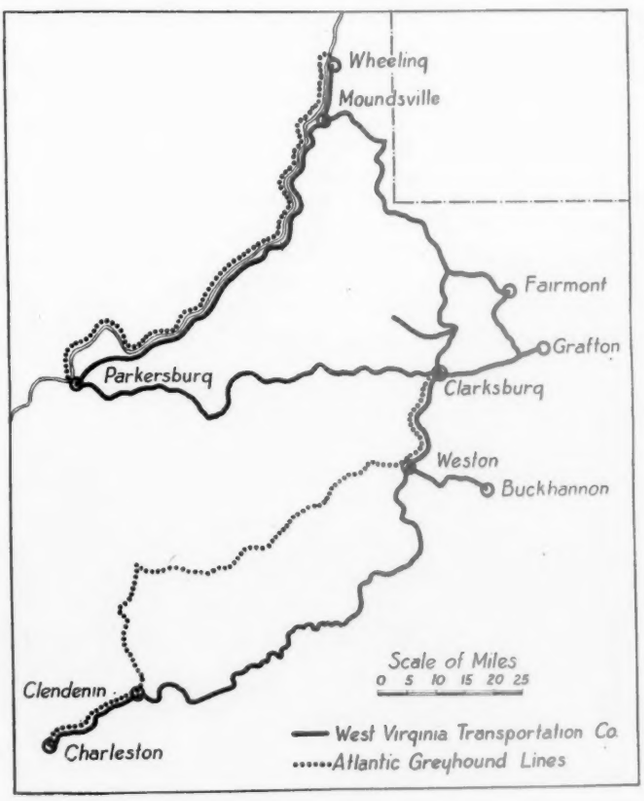
Service Co-ordinated

These two companies, in common with all other companies engaged in transportation service, suffered severely from the effect of the long period of depression and in order to meet the situation they made, from time to time, various drastic rearrangements in service to reduce operating expenses.

The first co-ordination of service between the West Virginia Transportation Company and the Atlantic Greyhound Lines was made in June, 1932, on the Clarksburg-Charleston route. Before that time, each company operated three trips in each direction daily, at approximately the same departure times, over their respective routes, which followed the same highways with the exception of the detour between Weston and Clendenin. Following conferences between the operating officers of the companies, a new arrangement was entered into, which provided a joint schedule with the trips staggered or alternated, each company operating two trips in each direction daily, thereby providing the more frequent service of four departure times instead of three and thus serving the traveling public better than it had been served before, and, at the same time, effecting a saving of one-third to each company in the number of coach miles operated. This saving resulted, of course, from the elimination of the duplicate trips that had formerly been operated.

As a result of the success of this first attempt at co-ordination, a similar arrangement was made to include the service on the Wheeling-Parkersburg routes, in March, 1933. On these routes, each company formerly ran four trips per day in each direction, while under the arrangement entered into at that time and which has been continued until the present, this was reduced to three trips and with the departure times staggered, a

(*Continued on page 932*)



Map Showing Co-ordinated Coach Routes

Germany Eliminates 'Wild-Cat' Operators

Strict regulation of highway motor carriers successfully stabilizes transportation industry

IN the two and a half years since highway transportation in Germany was placed under strict regulation by emergency decrees, "wild-cat" operators of motor coaches and trucks have disappeared from the transportation scene. At the same time, reputable operators have seen their business stabilized, as a result of the elimination of "mushroom" competition that sprang up, operated for a time without regard to actual costs, and then failed, only to be succeeded by others, equally foolish. As a result of the elimination of such competition, the transportation problem in Germany has been gradually worked out, or, rather, has worked itself out, so that passengers and freight are now being handled in Germany by the agency that can do so most conveniently and cheaply, whether such transportation be by rail or highway.

Competition Keen

With some 125,000 miles of excellent highways existing in Germany, the question of highway competition naturally presented a problem to the German Railroad Company, which enjoys a monopoly of rail transportation in that country. At the same time, the lack of regulation made it almost impossible for reputable highway operators to do business, since anyone who had sufficient credit to buy a motor coach or truck on the installment plan, had only to do so to start in the transportation business, without further formality. In addition, the Federal Post Office Department became a competitor, and, in 1931, was operating 2,000 miles of motor coach lines.

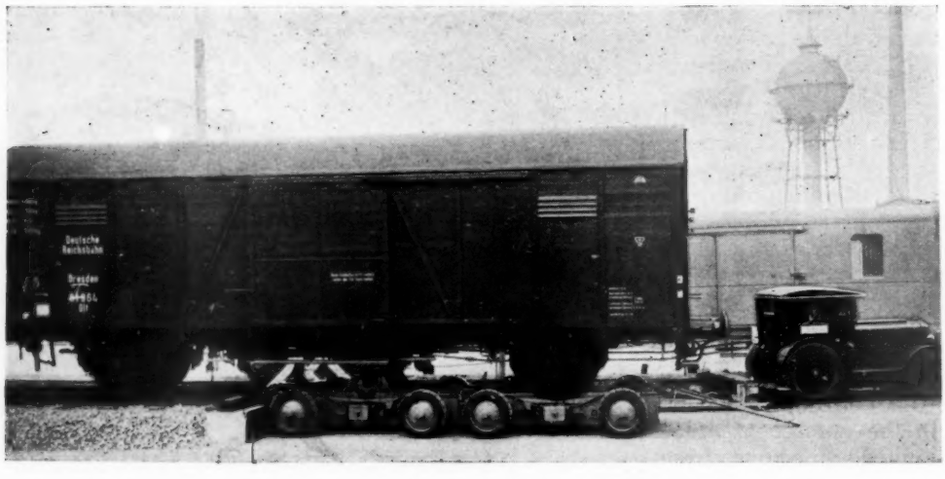
To meet this competition, the German Railroad Company established a highway subsidiary, which, in 1931, was operating 151 coach and truck routes, with a total mileage of 2,500 miles. Further the existing dray and freight forwarding facilities were consolidated into another subsidiary, known as the German Railroads Forwarding Company, and a nation-wide pick-up and delivery service was made effective on all freight shipped by rail. A uniform cartage rate, much lower than the former irregular charges for this service, was established throughout Germany.

Notwithstanding these efforts, the unregulated highway competition continued to make inroads into the revenues of the railways and of such highway operators as were endeavoring to conduct their business on an efficient and economical basis. The situation became so serious as to threaten the very existence of Germany's transportation system, and, to meet the emergency, the president of the German Reich proclaimed, on October 6, 1931, special and quite stringent laws governing highway transportation. These laws have since been amended and revised as conditions seemed to warrant, but their terms remain such as to eliminate "wild-cat" operations entirely.

Motor Coach Regulations

Before these laws were passed, only such motor coach lines as operated on a regular schedule over a certain route required an operation permit. The result was that very few permits were issued, since the operators could use different roads between the same two points on alternate days and avoid the necessity of obtaining permits by this means. The new regulations require that everyone who transports persons for money across the city limits must obtain an operating permit, the only exceptions being the sightseeing coaches which conduct round-trips, but these are now required to bring all passengers back to the point from which they started. The established lines of the post office department also operate without permits, but when any new routes are proposed, notice of such intention must be filed with the federal minister of transportation and with the German Railroad Company, the latter being entitled to protest if it is deemed expedient.

Every transportation company, including the German



An Interesting Co-ordinating Device Employed by the German Railways

On specially-designed highway trailers, called "movable tracks," freight cars are carried to the doors of shippers and consignees. The transfer of a freight car from the rails to its highway trailer is here shown. (Courtesy: German Tourist Information Office, New York.)

Railroad Co., is entitled to file protests against the establishment of motor coach lines "if the operation of the route is contrary to public interest." This stipulation gives the transportation interests of Germany a strong position on the question as to whether or not a new motor coach route shall be established.

Truck Regulation

Previously, only such trucks as were regularly operated over a designated route required an operation permit. All other trucks engaged in the irregular picking up of freight here and there were under no restriction whatever. Under the new laws, every truck owner who, for a compensation, transports freight for more than 30 miles, must obtain an operating permit. Moreover, an operating permit can only be granted if the operator supplies guarantees for safety and security.

In addition, the operator must comply with minimum freight rates fixed by the minister of transportation. This important provision is rigidly enforced, and the method of policing is as follows: Every motor vehicle carrying freight must be fully described in the application for an operating permit, and, if permitted to operate, must be marked with the name and business address of the operator. Bills of lading must be issued showing the classification and freight rate on each shipment carried, and every truck driver must be provided with copies of such bills, together with a complete list of all freight carried. Any policeman may, at any time, stop a truck, inspect its contents, and check up on the freight charges to ascertain their legality.

Severe Penalties for Violations

Severe penalties are provided for violations, including a jail sentence for operating without a permit, together with confiscation of the truck so operated. If it is discovered that the legal freight rate has not been charged and special low rates have been assessed to get the business, a penalty of one hundred times the difference between the low rate and the legal rate may be assessed against the truck owner. All such fines are turned over to the municipality or district where the violation is discovered and is used for highway maintenance, thus giving each community an incentive to detect violations.

Stringent as these regulations seem, they have, after a test of over two and a half years, given Germany a co-ordinated transportation system, and have protected such highway operators as endeavor to operate on an honest and efficient basis, by the complete exclusion of the evils of "wild-catting."

Rock Island Inaugurates "Ferry" Service for Truck Trailers

ON June 12, the Chicago, Rock Island & Pacific began the handling of motor truck trailers on specially equipped flat cars between Chicago and East Moline, Ill., for the Keeshin Motor Express Company, Chicago. Two trailers may be loaded on each flat car, and the first day's movement consisted of 7 trailers westbound and 14 trailers eastbound.

The conversion of the flat cars for this purpose was a relatively simple and inexpensive matter. In some cases, new flooring was necessary, and all the cars were equipped with chains and blocks, together with steel tail gates. The loading and unloading operations are performed by the same tractors that handle the trailers in their movement over the highways.

The Rock Island has arranged specially fast movement for the flat cars loaded with trailers. Cars ready to move from either the eastbound or westbound points of origin by 10 p.m. are spotted and ready for unloading at Chicago or East Moline as the case may be by 5 o'clock the following morning.

Service Open to Any Trucker

The service is, of course, open to any trucker, but in the first two days of its operation, it was used only by the Keeshin Motor Express Company. The president of this company is optimistic regarding the success of the plan, so much so, in fact, that he predicts the movement of some 4,000 carloads of his trailers during the first year. He states that, under the increased operating costs of trucking freight, brought about under the N.R.A. regulations, the rate charged by the railway for this "ferry" service is considerably cheaper than the cost of tires, gasoline and labor involved in hauling the trailers across Illinois by highway. He announces, too, that he is endeavoring to install the same system between Chicago and points on other railways.

Canadian Motor Coach Operations

ACTIVITIES in motor coach operation in Canada for the first six months of 1934 were featured by the increasing use of motor coaches by electric railways, motor coach service, in four cases, having supplanted street railway lines.

Steam railway motor coach activities in Canada are confined, at the present time, to three operations. One of these is the Canadian National Transportation Company, Ltd., motor coach subsidiary of the Niagara, St. Catherines & Toronto Railway, which is in turn a subsidiary of the Canadian National, and which operates 11 coaches between St. Catherines, Ont., and Niagara Falls. Another is the Canadian Pacific Transport Company, motor coach operating subsidiary of the Grand River Railway which, in turn, is a subsidiary of the Canadian Pacific, and which operates three motor coaches between Galt, Ont., and Preston.

Quebec Central Transportation Company

The third and largest motor coach operation by a railway subsidiary, as far as mileage is concerned, is the Quebec Central Transportation Company, motor coach operating subsidiary of the Quebec Central Railway, which is also a subsidiary of the Canadian Pacific. The following routes are now being operated by this company: Levis, Que., to St. George and Morisset, 75 miles; Sherbrooke, Que., to Newport, Vt., 50 miles; Thetford Mines, Que., to Sherbrooke, 72 miles; Valley Junction, Que., to Lambton, 53 miles. Most of these coaches carry sack mail in addition to passengers. In 1933, the earnings per coach-mile of this company were 30.95 cents, and the expenses, including depreciation, amounted to 29.35 cents. While this spread of a little over 1½ cents per coach-mile could hardly be called an excessive profit, the operation of these motor coaches by the railway has enabled it to save quite a sum in that the coaches have replaced steam trains which had been operating on an unprofitable basis for some time.

Railway Labor Act Amendments Passed

(*Continued from page 924*)

union officials may want him to join. The House language and the amendment of the Senator from Montana both use the words 'company union.' This provision may easily become a sort of model piece of legislation on this subject. If, by law, we are going to set up a prohibition against the carrier requiring its employees to join a company union, we ought not to leave the law in such form that the companies could be required to compel a man to join a general employees' union." Senator Robinson urged Senator Wheeler to withdraw his controversial amendments, which he declined to do, but after the amendments had been rejected without a record vote Senator Hastings made no further attempt to delay the proceedings. It was stated afterward that Senator Hasting was filibustering mainly against another bill, but at any rate his efforts, coupled with those of Senator Dill, helped materially to prevent the adoption of the Wheeler amendments.

The bill definitely establishes the principal that the majority of any craft or class of employees shall have the right to determine who shall be the representative of the craft or class and by providing for selection of the board of adjustment members by national organizations deprives any minority of representation on such boards.

The bill applies particularly to the adjustment of grievances arising out of the interpretation or application of agreements concerning rates of pay, rules, or working conditions and provides in great detail for the machinery of the election of employees representation and for the handling of grievances not adjusted locally. The National Railroad Board of Adjustment is to consist of 36 members, 18 selected by the carriers and 18 selected "by such labor organizations of the employees, national in scope, as have been or may be organized in accordance with the provisions of section 2 of this act."

If either the carriers or the labor organizations fail to designate representatives the Mediation Board is to make the appointment directly. The adjustment board is to be composed of four divisions, to have jurisdiction over disputes involving different classes of employees. Upon failure of any division to agree upon an award because of a deadlock or inability to secure a majority vote, the division is to select a neutral "referee" to sit with the division and make an award. If a carrier does not comply with an order of a division of the adjustment board the petitioner may file suit in a federal district court and the courts are empowered to enforce or set aside the order.

Divisions of the adjustment board are also given authority, in their discretion, to establish regional adjustment boards to act in their stead for such limited period as the division may determine to be necessary.

The present Board of Mediation is abolished, effective 30 days from the effective date of the act, and the new board is to consist of three members appointed by the President.

The general provisions relating to employee organization are as follows:

Third. Representatives, for the purposes of this act, shall be designated by the respective parties without interference, influence, or coercion by either party over the designation of representatives by the other; and neither party shall in any way interfere with, influence, or coerce the other in its choice of representatives. Representatives of employees for the purposes of this Act need not be persons in the employ of the carrier, and no carrier shall, by interference, influence, or coercion seek in any manner to prevent the designation by its employees as their representatives of those who or which are not employees of the carrier.

Fourth. Employees shall have the right to organize and bargain collectively through representatives of their own choosing. The majority of any craft or class of employees shall have the right to determine who shall be the representative of the craft or class for the purposes of this Act. No carrier, its officers or agents, shall deny or in any way question the right of its employees to join, organize, or assist in organizing the labor organization of their choice, and it shall be unlawful for any carrier to interfere in any way with the organization of its employees, or to use the funds of the carrier in maintaining or assisting or contributing to any labor organization, labor representative, or other agency of collective bargaining, or in performing any work therefor, or to influence or coerce employees in an effort to induce them to join or remain or not to join or remain members of any labor organization, or to deduct from the wages of employees any dues, fees, assessments, or other contributions payable to labor organizations, or to collect or to assist in the collection of any such dues, fees, assessments, or other contributions: Provided, That nothing in this Act shall be construed to prohibit a carrier from permitting an employee, individually, or local representatives of employees from conferring with management during working hours without loss of time, or to prohibit a carrier from furnishing free transportation to its employees while engaged in the business of a labor organization.

Fifth. No carrier, its officers, or agents shall require any person seeking employment to sign any contract or agreement promising to join or not to join a labor organization; and if any such contract has been enforced prior to the effective date of this Act, then such carrier shall notify the employees by an appropriate order that such contract has been discarded and is no longer binding on them in any way.

Co-ordination Succeeds in West Virginia

(*Continued from page 929*)

more frequent service was provided with a reduction of 25 per cent in the number of coach miles operated.

Nor were the savings in coach miles the only economies effected by this co-operation. Originally, the West Virginia Transportation Company maintained its own terminals and ticket offices in the cities of Charleston and Parkersburg, but, in 1933, under the co-ordination plan, they were discontinued and arrangements were made for the joint use of the Atlantic Greyhound facilities through the payment of a commission on its sales of tickets. In addition, there was also put into effect a reciprocal arrangement for the storage, cleaning and mechanical work on coaches laying over at Clarksburg and Charleston, whereby each company has the use of garage facilities maintained by either of the companies. In Clarksburg, the Atlantic Greyhound Lines use the West Virginia Transportation Company's garage, while in Charleston the latter company uses the Atlantic Greyhound garage.

Although the terminals are used jointly and tickets for transportation on the coaches of the two companies between the points named are honored interchangeably, there has been no loss of identity on the part of either company, and both continue to operate their own equipment over their respective routes.

The benefits derived from the operation of these two routes on a co-ordinated plan are two-fold, first, the public benefits from the increased frequency of the service with a choice of either route available, and, at the same time, each company is able to effect considerable savings in operating expenses because of the reduction in the number of coach-miles operated per day, resulting from the elimination of duplicate schedules, and by the common use of terminal facilities, which eliminates expenses also in this connection.

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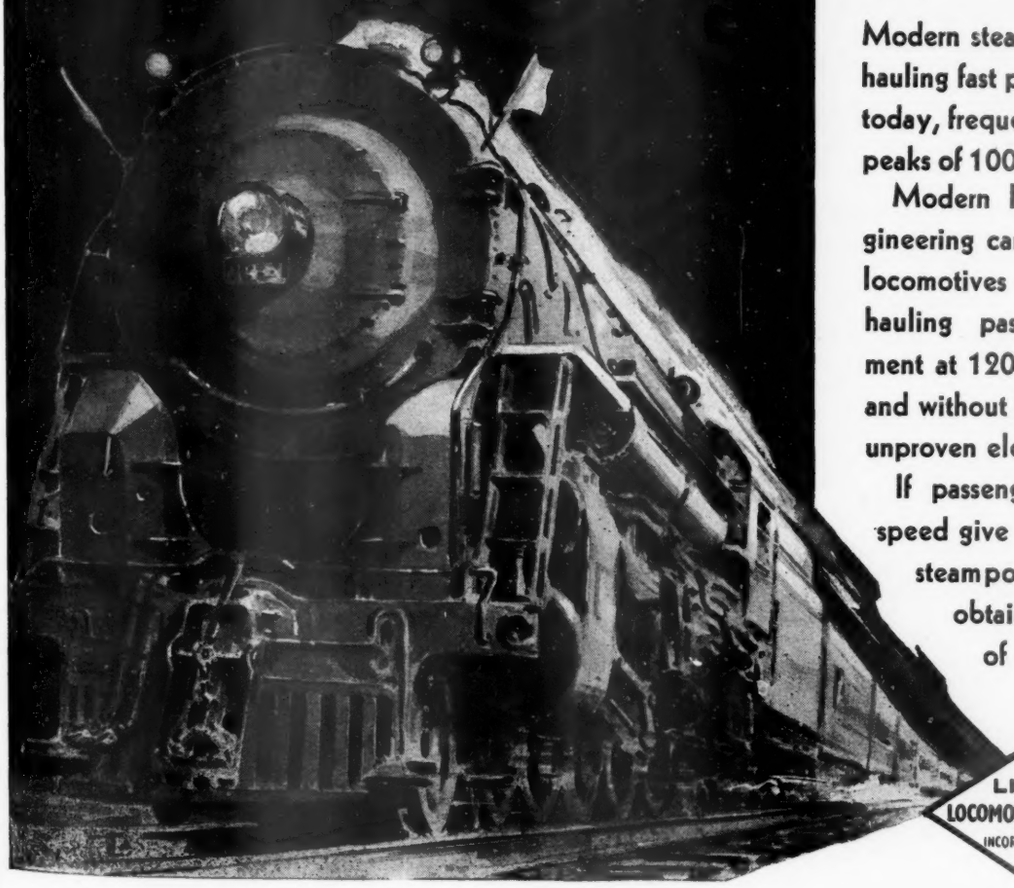
Steam

FOR SPEED, RELIABILITY AND ECONOMY



Modern steam locomotives, hauling fast passenger trains, today, frequently operate at peaks of 100 miles per hour.

Modern locomotive engineering can supply steam locomotives capable of hauling passenger equipment at 120 miles per hour and without introducing any unproven elements.

If passengers want high speed give it to them with steam power and thereby obtain a maximum of safety.

LIMA LOCOMOTIVE WORKS INCORPORATED

NEWS

Transport Legislation in the 73rd Congress

Two bills on railroad labor program passed—No highway or water carrier regulation

Two of the bills on the program of the railroad labor organizations which were opposed by the railroads, the compulsory pension bill and the bill to amend the railway labor act of 1926, were passed by Congress shortly before its adjournment on June 18, the first over the opposition of Co-ordinator Eastman and the second on his recommendation. On the other hand, the bills which Mr. Eastman had recommended in reports to the President and Congress, which were also desired by the railroads, to provide for Interstate Commerce Commission regulation of highway and waterway transportation, did not even reach the stage of a hearing and were not even introduced in the House, although they were introduced in the Senate by Senator Dill marked "by request." The Rayburn bill providing for truck regulation, very similar to the Eastman bill, was given a hearing by the House committee on interstate and foreign commerce. Mr. Eastman has indicated that he proposes to press his recommendations in the next Congress.

Other bills advocated by the Railway Labor Executives' Association, including the six-hour day bill, the train-limit bill, the full-crew bill, the hours of service bill, the flagging bill, and the employers' liability bill did not reach the stage of a committee report, except that the House committee reported the six-hour bill without recommendation, and the bill to amend the fourth section of the interstate commerce act, advocated by the railroads, labor, and the shippers, was not given a hearing.

Provision for a five-year extension from February 1, 1935, of loans by the Reconstruction Finance Corporation to the railroads, subject to approval by the Interstate Commerce Commission, was included in the bill relating to loans for industrial purposes by Federal Reserve banks on which the conference report was adopted on June 16.

An amendment to the interstate commerce act intended to pave the way for reductions in railroad freight rates on building materials to aid the government's proposed campaign for home-building and renovation was included in the housing bill passed on June 18. The amendment provides that "nothing in this act shall prevent any carrier or carriers subject to this act from giving reduced rates for the transportation of commodities to be specified by the commission as hereinafter provided, to or from any section of the country, with the object of improving nation-wide housing standards and providing employment and stimulating industry, if such reduced rates have first been authorized by order of the commission (with or without a hearing); but in such order the commission shall specify the commodities as to which this proviso shall be declared effective and shall specify the period during which such reduced rates are to remain in effect."

Senator Barkley, who introduced the amendment, said it was drawn by Commissioner Eastman after conference with the Interstate Commerce Commission and the Association of Railway Executives. Somewhat silimar amendments were included in other bills providing for relief expenditures, to protect the railroads against charges of discrimination as to the various rate reductions they are being asked to make for purposes connected with relief work. The bill providing for drought relief includes the following:

"If, during the present drought emergency, a carrier subject to the Interstate Commerce Act shall, at the request of any agent of the United States, authorized so to do, establish special rates for the benefit of drought sufferers, such a carrier shall not be deemed to have violated the Interstate Commerce Act with reference to undue preference or unjust discrimination by reason of the fact that it applies such special rates only to those designated as drought sufferers by the authorized agents of the United States or of any State."

I. C. C. Considers Investigation of Pipe-Line Rates

The Interstate Commerce Commission, Division 2, announced on June 20 that it had considered the petition of the Louisiana-Arkansas Refiners Association for suspension of tariffs of the Atlantic Pipe Line Company, Shell-Pipe Line Corporation, Stanolind Pipe Line Company, The Texas Pipe Line Company and the Texas-Empire Pipe Line Company, naming reduced rates for the transportation of crude petroleum oil via pipe lines from points in Texas, Oklahoma and Kansas to destinations in the same and other states, principally Indiana, Illinois, Kansas, Missouri, Oklahoma, and Texas, and had denied the petition. The commission will, however, give further consideration to this matter with a view to possible entry upon its own motion of an order of investigation with respect to the rates covered by the tariffs in question.

E. H. Harriman Memorial Medal Awards for 1933

Winners are Union Pacific; Duluth Missabe & Northern and Chicago & Illinois Midland

The American Museum of Safety made the E. H. Harriman Memorial Medal Awards for the year 1933 at a luncheon meeting in the Union League Club, New York, Tuesday, June 19. President Arthur Williams was assisted in the ceremonies by Director Albert A. Hopkins and Lew R. Palmer, secretary of the Harriman Committee of Awards.

Chairman Williams, in his opening remarks, said: "According to the advance figures issued by the Interstate Commerce Commission covering railroad accidents for the calendar year 1933, there has been a continued reduction in the number of deaths to passengers and employees on Class I railroads. The combined fatalities for the year 1933 were 538, as compared with 585 for 1932; 685 for the year 1931, and 2,164 for 1923. The combined passenger and employee injuries for the year 1933 were 17,555 as compared with 19,780 for 1932; 25,643 for the year 1931, and 158,525 for 1923.

"In 1923 there were approximately 24,000 collisions and derailments, which cost the railroads $25,300,950. In 1932 there were 4,586 collisions and derailments, costing $6,659,752—a reduction in operating expense of $18,641,198; and for the nine-year period (1924-1932) the cumulative reduction in operating expense due to collisions and derailments amounted to more than $81,000,000. To this must be added the saving in personal injury expense resulting from the saving of 928 lives and the prevention of 20,414 reportable injuries during this nine-year period, due to the reduced number of collisions and derailments."

Louis Wiley, of the New York Times, made an address in which he included this statement: "It is to the credit of the American railroads that the factor of safety has always taken precedent over the triumphs of speed. The railroads have accepted the public safety as a public trust. They have made safety the first tradition of the railroad, and have spared no effort or expense to guarantee that, so far as human brains can foresee, all precautions against accident are taken. Even through these years of depression there has been no sacrifice of the essential of railroad service, which is safety. No form of travel is equally as safe. That condition has not come about without intense con-

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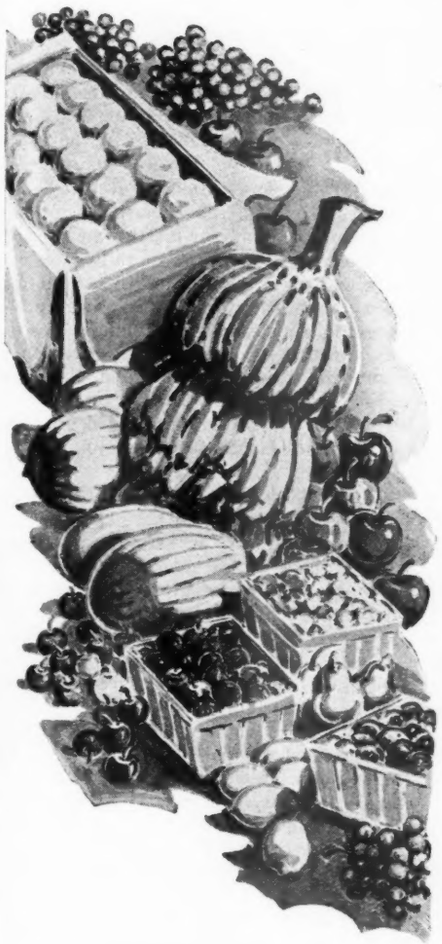
PERISHABLES
ARE KEPT MOVING BY
BOOSTER LOCOMOTIVES

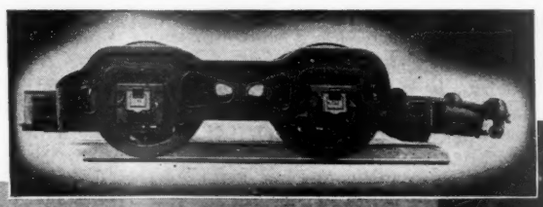


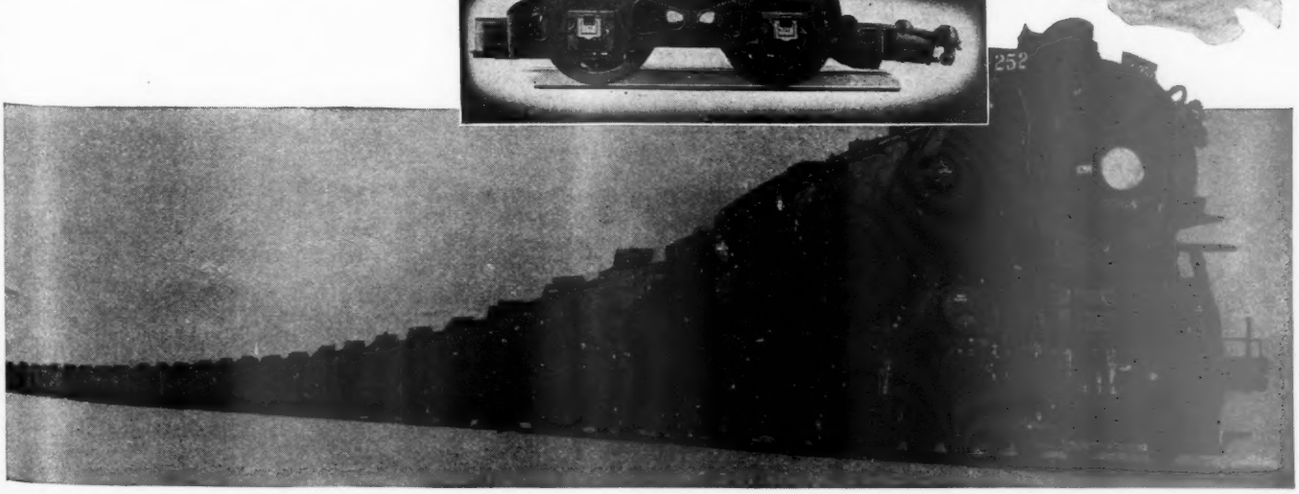
THE LOCOMOTIVE BOOSTER

● Fruit growers throughout the country depend upon transportation to deliver their products in good condition to widely separated markets. "Soft-fruits", in particular, present difficulties. They must not be damaged—train schedules must be kept to assure proper re-icing in transit.

The Locomotive Booster has helped develop this service to a high state of efficiency. It helps start long freights without shock and damage to fruit. The added power speeds up transportation through the yards, over heavy grades, and helps bring such freight through on time.

The Booster serves the fruit-grower well and at the same time provides the railroads using it with low cost haulage per ton mile that makes this exacting service profitable.





FRANKLIN RAILWAY SUPPLY CO., INC.

NEW YORK CHICAGO MONTREAL

centration of our railroad executives and every employee, down to the humblest track-walker, upon the obligation of the roads to carry us safely.

"One of the obigations of the roads, likewise, is the safety of those working for them. It is an obligation that roads and workers undertake no less lightly than their obligation toward the traveling public. The reduction in casualties among workers in Class I railroads of this country in the last ten years is remarkable."

The gold medal was awarded to the Union Pacific Railroad Company, it having recorded the lowest total weighted casualty rate of any of the 37 major railroads in Group A, this being also the lowest rate ever attained by a Group A railroad. According to the records of the Interstate Commerce Commission, the Union Pacific Railroad operated 256,897,000 passenger miles during the year 1933 without a single passenger injury; and, with an exposure of approximately 35,000,000 man-hours, only two employees were killed on duty. This is the fifth time the Union Pacific Railroad has been awarded the Harriman Gold Medal. The presentation of the medal and certificate was made by William Averill Harriman and Edward Rolland Harriman, Vice-President W. M. Jeffers receiving them for the railroad.

The silver medal was awarded to the Duluth, Missabe & Northern Railway, as one of the 65 contenders for honors in this group. This road operated more than a million and a half passenger miles without a single passenger injured, and operated approximately four and a half million man-hours without an employee fatality, and with only five reportable injuries. In fact, these five reportable injuries were the only casualties recorded for the year 1933. This is the fifth time this road has been awarded the Harriman Silver Medal. Mr. Williams invited former President James A. Farrell of the United States Steel Corporation, to make the presentation, and it was received for the road by President C. E. Carlson.

The bronze medal for Group C roads was awarded the Chicago & Illinois Midland Railway Company with the following citation: "This railroad has virtually climbed from the bottom to the top of this group of Class I railroads in three years, having recorded a clear fatality record covering both passengers and employees, and stands charged with only three employee injuries, which gives them a reduction of 94 per cent during a ten-year period. In the absence of President J. F. Gilchrist, the medal was received by W. C. Hurst, senior vice-president of the railroad, the presentation being made by the Messrs. Harriman.

In order to give public recognition to the contribution made by the loyal and conscientious leaders on the firing line—the foremen—the Union Pacific was asked to designate that system's senior safety veteran, and have him present at the luncheon. Jerome Mauk, a section foreman at Belleville, Kan., was selected and was introduced by President Carl R. Gray. In his 39 years of service with the railroad, neither he or a man under him has been injured.

Central Western Board Meeting

The twelfth annual and thirtieth regular meeting of the Central Western Shippers' Advisory Board will be held at Troutdale-in-the-Pines, Colo., on June 30. Besides the reports of various committees, the program will include an address on Government Ownership of Railroads by H. W. Roe, traffic manager of the Mid-Continent Petroleum Corporation, and a speech by J. L. Keeshin, president of the National Highway Freight Association on The Need for the Regulation of All Transport.

National Association of Railroad Enthusiasts

The annual meeting of the National Association of Railroad Enthusiasts, originally scheduled for June 21 at North Station Terminal Building, Boston, Mass., as reported in the *Railway Age* of June 9, has been postponed to June 28. Also, the place of the meeting has been changed to the South Station dining room, Boston. Members of the Association include railway employees and others having as a common bond and interest in railroads.

Railway Development Meeting

The twenty-sixth annual meeting of the American Railway Development Association was held at Kansas City, Mo., on June 20-22. Besides a consideration of railway development problems, the program included addresses on Livestock Truck Transportation, by A. R. Miesen, livestock development agent of the Northern Pacific; Pre-Cooling of Fruits and Vegetables, by W. L. English, supervisor of agriculture and refrigeration of the St. Louis-San Francisco; and Freight Claims, by J. L. McCormack, supervisor of freight loss and damage claims of the St. Louis-San Francisco.

I. C. C. Modifies Accounting Classifications

The Interstate Commerce Commission, acting through Commissioner Eastman, to whom the matter was assigned for action, has issued a series of modifications of its accounting classification for steam railroads, dated June 13 and effective January 1, 1935, in accordance with the provisions of its report and order in No. 15,100, Depreciation Charges of Steam Railroad Companies. The order has been issued in mimeographed form but the Association of Railway Accounting Officers has prepared a reprint in a form convenient to be inserted in the present classification which may be obtained from the association at 5 cents each when ordered in lots of 10 or more or 10 cents each in lots of less than 10.

B. & O. Using Cleveland Union Station

Baltimore & Ohio passenger trains on June 17 commenced using the facilities of the Union station at Cleveland, Ohio. Train schedules which had been in effect from the Cleveland station of the Baltimore & Ohio are being observed at the Union station except that train No. 34 now leaves Cleveland at 9:15 p.m. instead of 9:30 p.m.

Other railroads operating from the Union station are the New York, Chicago & St. Louis, Cleveland, Cincinnati, Chicago & St. Louis and the New York Central. With the entrance of the Baltimore & Ohio into the Union terminal according to an announcement by W. B. Calloway, general passenger traffic manager of the road, there will be afforded more direct interchange between the above-mentioned lines and the Baltimore & Ohio, particularly to Pittsburgh, Pa., Washington, D. C. and the southeast.

Superintendents Meet

With nearly 150 members in attendance, the fortieth annual convention of the Association of Railroad Superintendents met in Chicago, on June 19-21. In the opening address, H. G. Taylor, chairman of the Western Association of Railway Executives, stressed the importance of acquainting the public with the steady and continuing improvements in railway equipment and service, in order to combat the present inclination to regard railway managements as backward and unprogressive. He expressed the opinion that never in the history of transportation have the railways been in better position, in view of the lessons learned during the depression, to handle the transportation job of the nation.

G. B. Vilas, general manager, Chicago & North Western, stressed the importance of the superintendent in safety work, and outlined many of the methods used by the C. & N. W. in creating its outstanding safety record of the past four or five years. Joe Marshall, special representative, American Railway Association outlined a number of suggestions for superintendents to follow in maintaining the excellent record in freight claim prevention that has characterized the past few years. W. D. Beck, district manager of the car service division of the A. R. A. at Chicago, assured the superintendents that the best and most efficient way of handling freight cars was in strict accordance with the car service rules.

The convention was also addressed by A. N. Williams, president, Chicago & Western Indiana; J. M. Fitzgerald, vice-chairman, eastern committee on public relations; Robert Collett, fuel agent, St. Louis-San Francisco, and J. R. Turney, director, section of freight service, of the federal co-ordinator of transportation's office. Mr. Turney's address appears in this issue, and a detailed report on the other addresses, together with a resume of the committee reports, will appear in the next issue.

Joint Bus Traffic Survey Being Made by Co-ordinator and N. R. A.

The federal co-ordinator of transportation and the transportation section of the National Recovery Administration have undertaken a joint survey for the purpose of exploring the flow of motor bus traffic, including the volume of traffic, segregated by origins and destinations, the service units employed for handling such traffic and the expense. Similar inquiries have been made or are being made of railroads, air lines, and water carriers as to their passenger traffic, and the data will make possible a national survey of traffic move-

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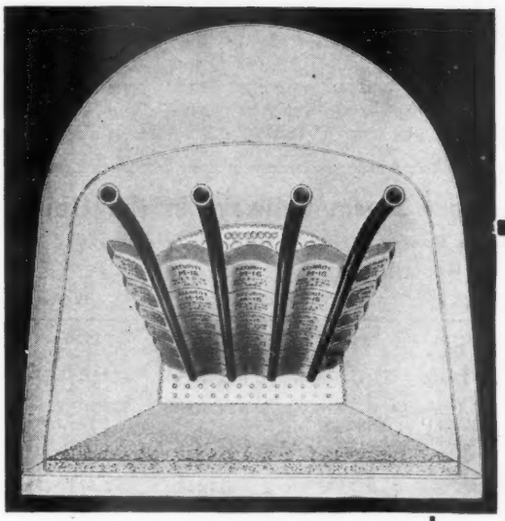
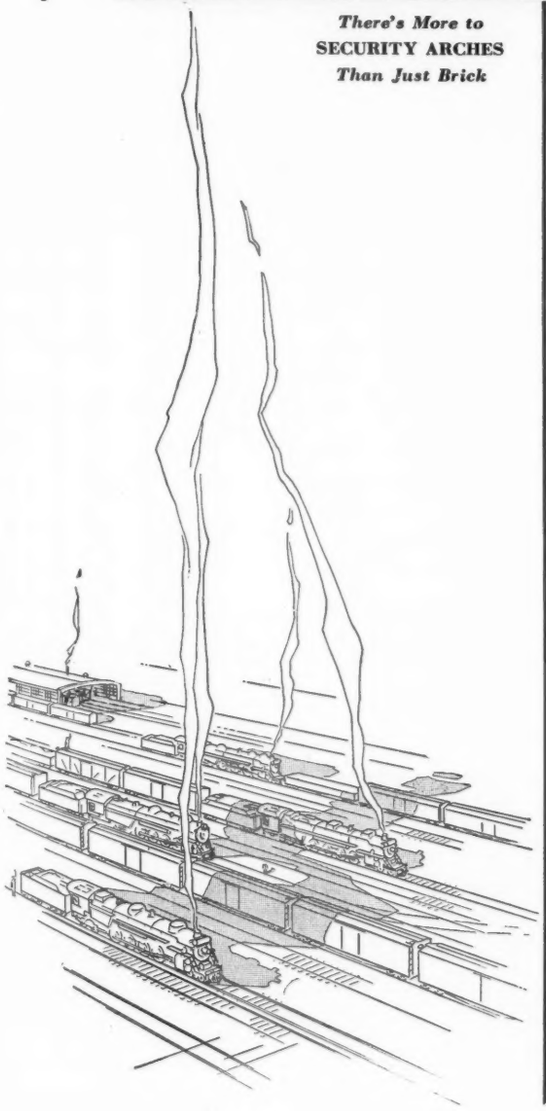


There's More to
SECURITY ARCHES
Than Just Brick



This ARCH BRICK *Needs No* Nurse-Maid

Too many vital matters absorb every minute of the railroad officer's time to permit his playing nurse-maid to Arch Brick.

He knows that for 25 years the American Arch Company has looked after all details of Arch Brick supply. He knows he gets long life and a minimum of train delays caused by defective brick.

He is content to leave undisturbed a situation that is well handled. For years American Arch Company engineers have served him as counsel on combustion problems, have laid out designs for new power, have kept brick at needed points so Arches could be maintained properly and have helped him regulate conditions to secure the best possible service from Arch Brick.

This arrangement for Arch Brick supply the railroad officer is content to rely upon.

HARBISON-WALKER REFRACTORIES CO.
Refractory Specialists

NRA MEMBER U.S. WE DO OUR PART

AMERICAN ARCH CO.
INCORPORATED
Locomotive Combustion Specialists » » »

ments and national passenger transportation needs. The results will be so compiled as to make them of maximum benefit to the transportation industries in the analysis of their own operations and opportunities.

Because Co-ordinator Eastman's jurisdiction is limited to railroads arrangements have been made to conduct the inquiry with the assistance of the N.R.A. and the motor bus code authority and a questionnaire prepared jointly has been sent by the code authority to the bus companies calling for information to be tabulated by the Co-ordinator's Section of Transportation. "Specifically," the accompanying letter sent out by the code authority says, "the objectives of these studies are to determine what should be

Operating Revenues and Operating Expenses of Class I Steam Railways in the United States

Compiled from 148 Monthly Reports of Revenues and Expenses Representing 149 Class I Steam Railways

FOR THE MONTH OF APRIL, 1934 AND 1933

Item	United States		Eastern District		Southern District		Western District	
	1934	1933	1934	1933	1934	1933	1934	1933
Average number of miles operated	239,182.14	241,190.96	59,119.12	59,548.93	45,455.74	45,848.54	134,607.28	135,793.49
Revenues:								
Freight	$214,265,895	$180,195,260	$94,178,443	$74,867,140	$44,093,618	$38,242,681	$75,993,834	$67,085,439
Passenger	27,044,885	22,919,248	16,337,310	14,283,632	3,824,467	2,857,247	6,883,108	5,778,369
Mail	7,402,352	7,404,593	2,866,439	2,954,464	1,314,804	1,259,422	3,221,109	3,190,707
Express	5,082,402	4,448,318	2,137,259	1,809,441	1,259,884	1,012,559	1,685,259	1,626,318
All other transportation	6,126,601	5,427,687	3,252,092	3,037,626	645,710	503,140	2,228,799	1,886,921
Incidental	4,963,110	4,029,261	2,756,600	2,294,970	817,797	644,153	1,388,713	1,090,138
Joint facility—Cr.	712,991	610,670	236,635	209,550	158,695	132,568	317,661	268,552
Joint facility—Dr.	207,357	175,994	52,303	58,194	11,540	14,927	143,514	102,873
Railway operating revenues	265,390,879	224,859,043	121,712,475	99,398,629	52,103,435	44,636,843	91,574,969	80,823,571
Expenses:								
Maintenance of way and structures	30,133,285	24,446,085	11,726,113	9,233,197	5,984,798	4,934,401	12,422,374	10,278,487
Maintenance of equipment‡	55,121,154	45,247,799	25,465,495	20,005,795	10,180,962	8,396,264	19,474,697	16,845,740
Traffic	7,289,357	7,012,453	2,713,510	2,560,993	1,406,365	1,365,625	3,169,482	3,085,835
Transportation	93,581,654	83,301,406	44,280,325	38,273,055	16,013,066	14,433,715	33,288,263	30,594,636
Miscellaneous operations	2,080,272	1,695,095	1,050,091	849,494	272,944	219,917	757,237	625,684
General	12,184,359	11,739,972	5,323,946	5,058,999	2,084,595	1,932,493	4,775,818	4,748,480
Transportation for investment—Cr.	203,338	143,429	66,178	45,133	21,422	14,149	115,738	84,147
Railway operating expenses	200,186,743	173,299,381	90,493,302	75,936,400	35,921,308	31,268,266	73,772,133	66,094,715
Net revenue from railway operations	65,204,136	51,559,662	31,219,173	23,462,229	16,182,127	13,368,577	17,802,836	14,728,856
Railway tax accruals	21,556,930	21,823,508	9,014,438	9,014,466	4,323,306	4,274,802	8,219,186	8,534,240
Uncollectible railway revenues	98,856	100,509	57,447	41,081	10,333	10,875	31,076	48,553
Railway operating income	43,548,350	29,635,645	22,147,288	14,406,682	11,848,488	9,082,900	9,552,574	6,146,063
Equipment rents—Dr. balance	8,212,173	7,225,634	4,324,258	3,370,932	828,966	943,858	3,058,949	2,910,844
Joint facility rent — Dr. balance	3,071,567	3,058,548	1,694,289	1,663,114	382,836	395,396	994,442	1,000,038
Net railway operating income	32,264,610	19,351,463	16,128,741	9,372,636	10,636,686	7,743,646	5,499,183	2,235,181
Ratio of expenses to revenues (per cent)	75.43	77.07	74.35	76.40	68.94	70.05	80.56	81.78
‡ Includes:								
Depreciation	15,407,546	14,877,291	6,770,349	5,779,625	2,881,255	2,988,028	5,755,942	6,109,638
Retirements	458,812	975,996	127,568	847,573	138,237	48,085	193,007	80,338

FOR FOUR MONTHS ENDED WITH APRIL, 1934 AND 1933

Average number of miles operated	239,365.34	241,293.17	59,146.06	59,557.50	45,473.53	45,863.23	134,745.75	135,872.44
Revenues:								
Freight	$865,691,574	$703,989,398	$387,387,998	$303,105,403	$180,713,890	$152,438,981	$297,589,686	$248,445,014
Passenger	107,061,003	95,110,759	65,058,163	57,736,104	15,750,316	12,756,510	26,252,524	24,618,145
Mail	30,104,433	30,001,018	11,692,217	11,779,294	5,315,832	5,169,432	13,096,384	13,052,292
Express	16,894,736	12,408,969	6,861,785	5,230,305	4,198,812	2,912,240	5,834,139	4,266,424
All other transportation	23,922,977	21,806,256	12,711,161	12,481,110	2,421,075	1,971,521	8,790,741	7,353,625
Incidental	19,232,707	16,518,178	10,638,477	9,585,535	3,131,135	2,521,222	5,463,095	4,411,421
Joint facility—Cr.	2,862,401	2,582,354	939,580	865,088	618,322	516,806	1,304,499	1,200,460
Joint facility—Dr.	759,614	746,430	204,613	211,064	59,456	71,080	495,545	464,286
Railway operating revenues	1,065,010,217	881,670,502	495,084,768	400,571,775	212,089,926	178,215,632	357,835,523	302,883,095
Expenses:								
Maintenance of way and structures	108,922,797	91,371,584	44,872,290	36,196,031	22,921,483	19,626,148	41,129,024	35,549,405
Maintenance of equipment†	215,895,637	183,695,297	100,006,093	81,031,819	40,373,077	35,056,388	75,516,467	67,607,090
Traffic	28,967,135	28,298,888	10,895,397	10,478,478	5,643,605	5,501,297	12,428,133	12,319,113
Transportation	383,554,339	344,182,958	184,733,345	159,610,225	65,025,675	58,836,821	133,795,319	125,735,912
Miscellaneous operations	8,570,330	7,301,194	4,321,597	3,710,918	1,195,429	949,458	3,053,304	2,640,818
General	48,632,412	48,217,734	21,314,588	20,790,958	8,256,905	8,046,075	19,060,919	19,380,701
Transportation for investment—Cr.	664,113	1,030,051	192,575	493,384	68,557	130,949	402,981	405,718
Railway operating expenses	793,878,537	702,037,604	365,950,735	311,325,045	143,347,617	127,885,238	284,580,185	262,827,321
Net revenue from railway operations	271,131,680	179,632,898	129,134,033	89,246,730	68,742,309	50,330,394	73,255,338	40,055,774
Railway tax accruals	84,509,064	87,015,460	34,673,502	34,868,652	17,287,005	17,341,506	32,548,557	34,805,302
Uncollectible railway revenues	368,664	327,629	189,565	127,562	67,798	37,170	111,301	162,897
Railway operating income	186,253,952	92,289,809	94,270,966	54,250,516	51,387,506	32,951,718	40,595,480	5,087,575
Equipment rents—Dr. balance	29,701,700	26,812,912	14,916,217	13,390,141	2,657,135	2,328,322	12,128,348	11,094,449
Joint facility rent — Dr. balance	12,006,204	11,601,126	6,652,437	6,106,085	1,451,428	1,328,719	3,902,339	4,166,322
Net railway operating income	144,546,048	53,875,771	72,702,312	34,754,290	47,278,943	29,294,677	24,564,793	*d 10,173,196*
Ratio of expenses to revenues (per cent)	74.54	79.63	73.92	77.72	67.59	71.76	79.53	86.78
† Includes:								
Depreciation	61,895,184	59,641,859	27,213,962	23,165,112	11,627,337	12,031,129	23,053,885	24,445,618
Retirements	1,590,961	3,927,211	432,368	3,367,955	524,981	203,398	633,612	355,858

d Deficit or other reverse items.

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to Revision.

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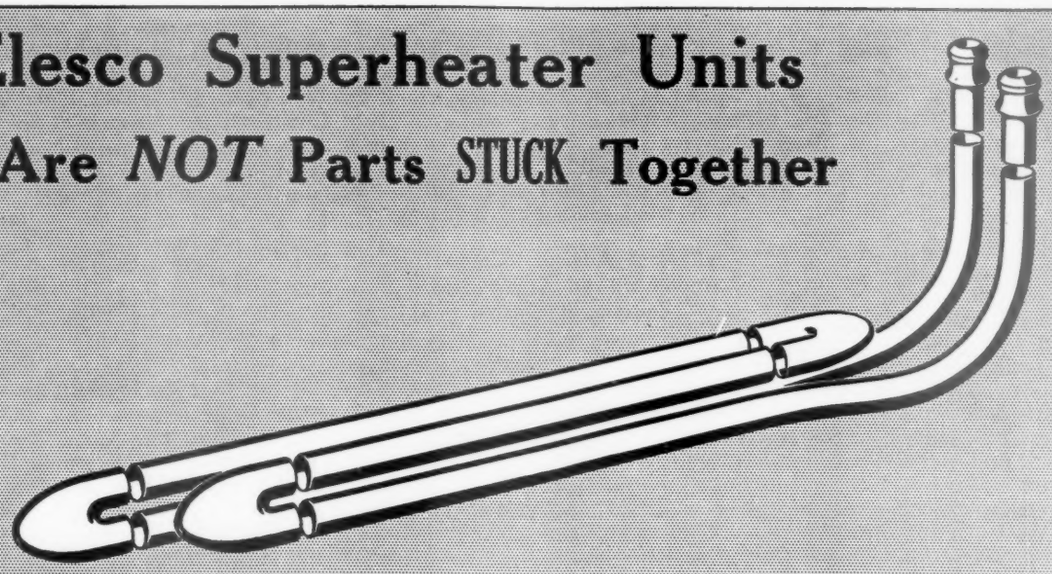
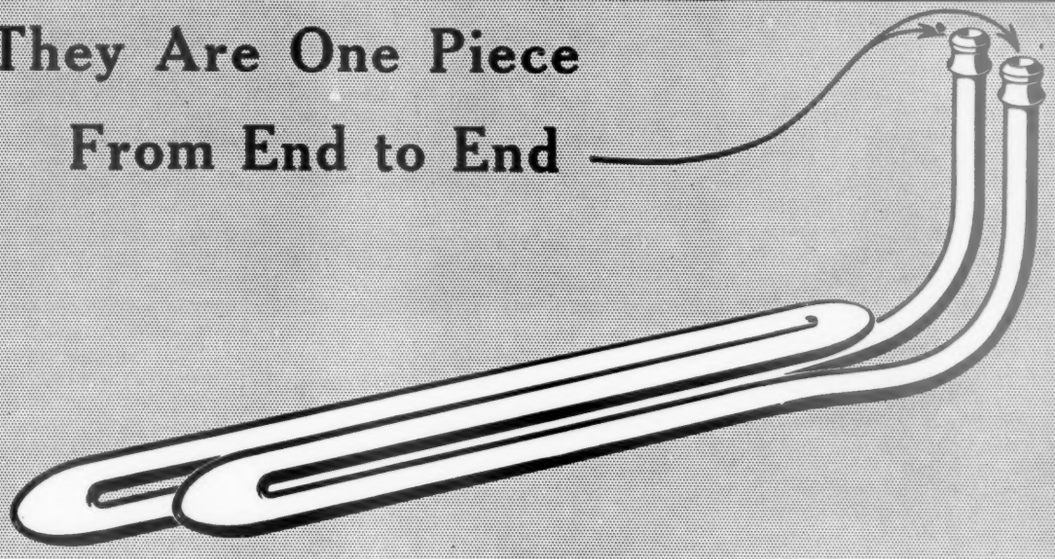
Elesco Superheater Units

Are *NOT* Parts STUCK Together



They Are One Piece From End to End



FOR a number of years Elesco superheater units have been formed by joining tubing by integrally machine-forged return bends. In contrast with the earlier use of cast-steel and welded return bends — forms of construction discarded long ago — the forged construction is far superior structually and more efficient.

Whether new or remanufactured, Elesco superheater units are of this forged construction. Each unit is a single piece of tubing from end to end — a homogeneous structure of uniform strength throughout, with increased thickness of the metal at the bend where it is most needed. Smooth internal and external surfaces, and uniform cross-sectional areas prevent restriction either of steam through the units or gases through the flues.

When superheater units become unserviceable, do not turn to obsolete methods of repair. Have them remanufactured — it is the cheapest method in the long run and it is safe.

THE SUPERHEATER COMPANY

Representative of AMERICAN THROTTLE COMPANY, INC.

60 East 42nd Street
NEW YORK

ELESCO

Peoples Gas Building
CHICAGO

NRA WE DO OUR PART A-885

Canada: THE SUPERHEATER COMPANY, LTD., MONTREAL

Superheaters - Feed Water Heaters - Exhaust Steam Injectors - Superheated Steam Pyrometers - American Throttles

done to increase the traffic moving by common carriers, to improve service, and at the same time to make traffic more profitable from the standpoint of passenger-carrying agencies." Replies to the questionnaire form are to be prepared for the month of July, 1934, and if records are available for a typical week of December, 1933, the operators are requested to prepare a supplemental report for that seven-day period, in order to make possible an analysis of seasonal influences on the direction of traffic.

The form calls for information as to ticket sales between 200 cities showing the number of passengers, passenger revenues, route miles, cash fares collected, state totals — intercity operations, intra-city operations, and various operating and traffic statistics.

Dotsero Cutoff Opened

The 38-mile Dotsero Cutoff that shortens the distance from Denver, Colo., to Pacific Coast points by 175 miles to provide a new major transcontinental route was formally opened June 16 with ceremonies at Bond, Colo. The ceremony began at 6:30 a.m. when the Zephyr of the Chicago, Burlington & Quincy and three special Denver & Rio Grande Western steam trains left Denver for Bond, where the Zephyr arrived at 11:58 a.m. During the morning, two special Denver & Rio Grande Western steam trains also departed from Grand Junction, Colo., and Salt Lake City, Utah, for Bond. The program at this point, broadcasted over National and Columbia net-works, included addresses by J. S. Pyeatt, president of the Denver & Rio Grande Western; L. W. Baldwin, trustee of the Missouri Pacific; Charles Elsey, president of the Western Pacific; Ralph Budd, president of the Chicago, Burlington & Quincy; L. M. Allen, passenger traffic manager of the Chicago, Rock Island & Pacific; the governors of Colorado and Utah and the mayors of Denver and Salt Lake City. The 2,000 persons attending the ceremonies were served a barbecue luncheon.

$200,000,000 Highway Fund Apportioned to States

Acting Secretary of Agriculture Tugwell on June 19 apportioned $200,000,000 among the 48 states, Hawaii and the District of Columbia, for highway construction. The appropriation was authorized by the Hayden-Cartwright act, signed June 18 by President Roosevelt, for highway construction under the provisions of the national industrial recovery act. Following the requirements of the law, the Acting Secretary apportioned seven-eighths of the total authorization on the basis provided by the federal highway act which prescribes three factors of equal weight based upon the area, population, and rural post-road mileage of the several states and Hawaii. The remaining one-eighth, as provided by law, was apportioned according to population.

The money is immediately available for allotment to construction projects on the federal aid highway system and its extensions into and through cities and on important secondary roads. The law requires that, in the absence of satisfactory reasons to the contrary, not less than 25 per cent of the apportionment to any state must be applied to secondary or feeder roads, including farm-to-market roads, rural free delivery roads, and public school bus roads. Expenditure of the money will be in accordance with rules and regulations to be issued by the Secretary of Agriculture.

Mechanical Advisory Committee Appointed to Study New Equipment Design

The various transportation studies being conducted by the Section of Transportation Service in Co-Ordinator Eastman's organization having progressed to the point where technical advice is needed in dealing with various problems connected with the modernizing of railroad operations and designs for new equipment, Mr. Eastman has appointed a mechanical advisory committee to co-operate with the section headed by L. K. Sillcox, vice-president of the New York Air Brake Company as chairman, and including also mechanical officers of several of the principal railroads and W. J. Patterson, director of the Bureau of Safety of the Interstate Commerce Commission. The railroad members are: F. H. Hardin, assistant to the president of the New York Central; F. W. Hankins, chief of motive power of the Pennsylvania; John Purcell, assistant vice-president, Atchison, Topeka & Santa Fe; and C. J. Bodemer, superintendent of machinery of the Louisville & Nashville.

Among the subjects assigned to the committee for study are cars, springs, draft gear, brakes, high-speed wheels, light materials, refrigeration, interchangeable bodies, containers, locomotives, rail, and motor cars.

Supply Trade

William E. Umstattd, executive vice-president of the **Timken Roller Bearing Company,** Canton, Ohio, has been elected president, to succeed **H. H. Timken,** who has resigned but who continues as chairman of the board. **Henry H. Timken, Jr.** has been elected a vice-president of the Timken Roller Bearing Company and a vice-president of the **Timken Steel & Tube Company.**

The Western Wheeled Scraper Company, Aurora, Ill., and the **Austin Manufacturing Company** of Chicago and Harvey, Ill., will be consolidated under the name of the **Western-Austin Manufacturing Company,** with general offices at Aurora, effective July 1. **The Austin-Western Road Machinery Company,** Chicago, will retain its identity with its general office at Aurora and will continue as general sales agent of the new consolidation. **W. G. Sharretts** has retired as eastern sales agent of the Western Wheeled Scraper Company, at New York.

C. D. Jenks, president of the **Chicago-Cleveland Car Roofing Company,** Chicago, has been appointed president of the **Railway Car Appliances Association,** to fill the vacancy left by the death of **W. E. Sharp,** president of the **Grip Nut Company.** Mr. Jenks was a member of the board of directors and his place on the board will be filled by **J. H. Sharp,** of the Grip Nut Company. **W. H. Winslow, Jr.,** of the firm of Defrees, Buckingham, Jones & Hoffman, has been elected secretary to succeed **Frances Kamrar,** resigned. The office of the secretary has been moved to 105 South LaSalle street, Chicago.

OBITUARY

A. E. Fant, president of the Gulfport Creosoting Company, Gulfport, Miss., died in that city on June 13 after an extended illness.

H. C. Butler, vice-president, Montreal Locomotive Works, Ltd., died suddenly at his home in Westmount, (Montreal) Que., on June 18.

Equipment and Supplies

P. W. A. Loans to Railroads

The latest addition to the rapidly growing fleet of modern high-speed trains will be put into operation by the Illinois Central. It will be built with part of a $2,000,000 loan allotted to that company by the Public Works Administration. The balance of the $2,000,000 allotted to the Illinois Central will be used to purchase 11 Diesel locomotives.

This is the second loan made to the Illinois Central, the first of $10,000,000 being for the purchase of rails, fastenings and cross ties, rebuilding bridges and repairing in its own shops 12,645 freight cars, 184 passenger cars and 148 engines. Work under this loan is well under way, nearly 4,000 men being employed in shops and on the right of way at many points on the Illinois Central lines and probably twice as many employed in production of materials being used.

In reporting that more than a quarter of a billion dollars worth of materials for use on public works projects were ordered between October and April the Public Works Administration has given a prominent place in the list to materials ordered with the proceeds of loans to railroads. The total value of iron and steel orders was placed at $125,000,000, of which $60,000,000 was said to have been accounted for by orders for railroad cars, locomotives, rails and rail fastenings, and of the April orders totalling $66,645,000 railroad items accounted for $26,700,000. "The railroad reconstruction and improvement phase of the P.W.A. program has been the first to reach peak production of employment," the statement said, "being unhampered by local laws and regulations which have held up the start of many non-

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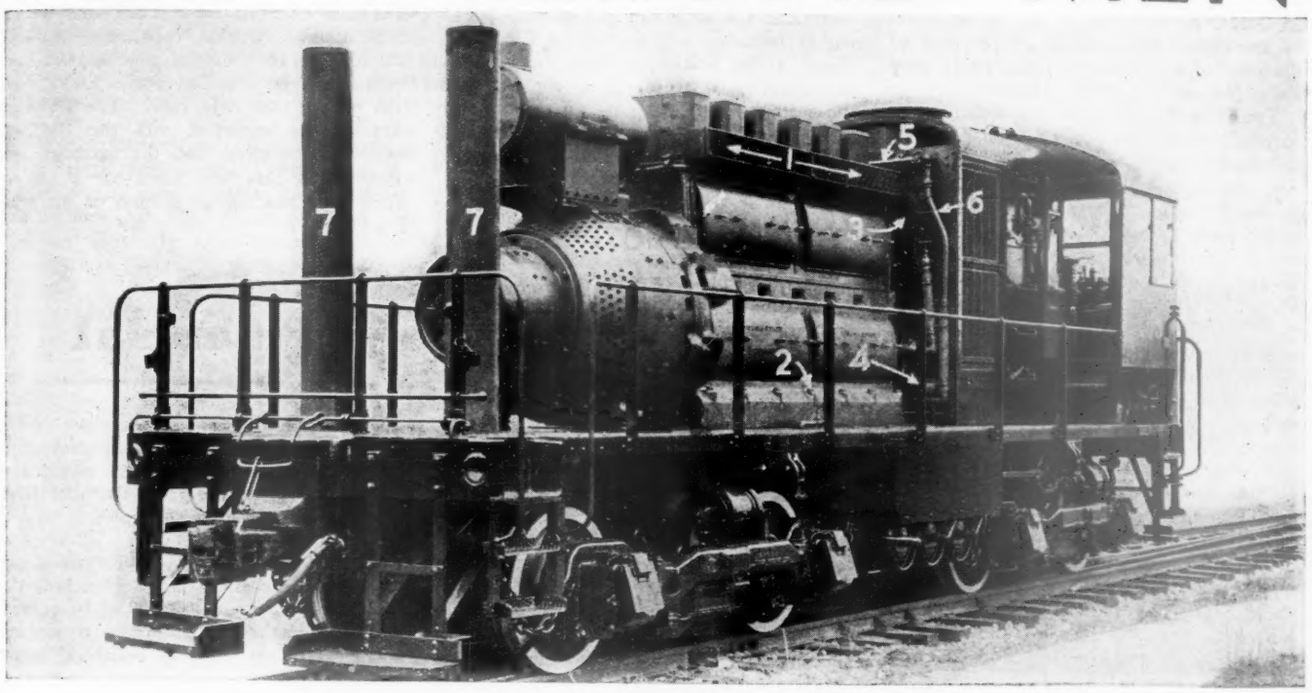
RAILROAD DIESELS FOR RAILROAD MEN



— AIR SIDE —

Hood removed exposing complete power plant.

1 Air intake filter.
2 Solid foundation bolting to frame.
3 Radiator fan motor.
4 Traction motor blower.
5 Radiator water pipe to engine.
6 Lubricator oil pipe to radiator.
7 Front sand boxes.

The importance of accessibility and its direct effect on maintenance costs is ingrained in the Alco organization through 100 years experience building railway motive power.

This series of advertisements (of which this is No. 4) will show why the Alco Diesel should be attractive to railroad men.

Always remember that the total cost of any motive power unit equals first cost plus operating cost plus maintenance. Considering these three factors as a whole the Alco Diesel becomes an outstanding purchase.

AMERICAN LOCOMOTIVE COMPANY

ALCO DIESEL

30 CHURCH STREET · NEW YORK · N.Y.

federal projects being constructed by states, counties, cities, and towns." The list of orders placed included: Locomotives, other than electric, $3,518,995; rail fastenings, excluding spikes, $3,504,575; rails, steel, $14,689,987; railway cars, freight, $31,709,581; railway cars, mail and express, $219,157; railway cars, passenger, $4,879,973; switches, railway, $656,254.

The P.W.A. has announced that on May 15 20,000 of the men in the track forces of the eleven railroads or 30 per cent of the men so employed on those roads were being paid out of P.W.A. loans.

The Southern Pacific is nearly half through with its roadway improvement and equipment repair program being carried forward with a $12,000,000 P.W.A. loan and nearly 12,000 men have been called back to work on the right of way and in the shops, it was reported to Public Works Administrator Harold L. Ickes by Major Philip B. Fleming, executive officer of P.W.A., who has just returned from a tour of inspection.

The Southern Pacific is using the $12,000,000 loan to purchase and lay 40,000 tons of new rail and the required fastenings in 273 miles of its track, to lay 1,820,000 new cross ties, renew bridges and trestles and make repairs to 748 locomotives, 3,811 freight cars and 406 passenger cars.

Work commenced in February, and P.W.A. has advanced $6,080,000 out of the $12,000,000. The balance will be advanced as requested by the company.

On May 15 the company reported that 5,467 men were employed on laying rails, installing cross ties and bridge and trestle renewals, while 6,030 men were employed in shops and roundhouses on repairing locomotives, freight and passenger cars. All of these men were employees of the Southern Pacific Company.

Between February and May the company paid out more than $2,000,000 in wages to its own men employed on the P.W.A. improvements and bought more than $4,000,000 worth of materials for their use. The work of repairing cars and locomotives has been spread out among the shops and roundhouses of the entire Southern Pacific system, so that the reemployment and resultant increased purchasing power will be created at many different localities. Track work is being done with local labor. Indians living on reservations crossed by the line have been given work on track improvements. The entire program is well ahead of schedule and will be finished by the first of the year.

A contract for a loan of $1,900,000 to the Baltimore & Ohio, signed on June 19, by Public Works Administrator Harold L. Ickes, will put men to work in the B. & O. shops at Keyser, W. Va.; in the plant of the American Car & Foundry Company at St. Charles, Mo., and in many other localities where materials to be used in those shops will be manufactured. The B. & O. will use $1,000,000 for 820 coal cars which are to be assembled in its shops at Keyser. The total cost of these cars will be $1,505,000, of which the company will supply material and cash to the extent of $505,000. About 270 men will be employed at Keyser on the job of assembling the cars, and several times that number will be given employment in many other localities and industries in manufacturing parts. The shop men at Keyser will be paid about $137,000. Six months will be required to turn the cars out.

The balance of the loan, $900,000, will be used to purchase 16 light weight passenger cars and a Diesel engine. The cars will be built in St. Charles, Mo., by the American Car & Foundry Company. The engine probably will be built in Cleveland, Ohio. In its Baltimore shops the B. & O. is converting a steam engine for use with the second train, using its own funds for that work. This contract covers the last loan to the B. & O. under allotments totalling $6,400,000.

LOCOMOTIVES

THE ILLINOIS CENTRAL has been allotted $2,000,000 by the Public Works Administration for a streamlined train and 11 Diesel locomotives. The streamlined train will cost around $500,000 and will be placed in operation between Chicago and St. Louis, Mo., on a four-hour schedule as compared with the present schedule of 6½ hr. Of the 11 locomotives, 8 will be equipped with 600-hp. engines. These locomotives, which will cost $85,000 each, will be used in switching service. The three other locomotives will be equipped with 1,800-hp. motors. These locomotives will cost $200,000 each and will be used in heavy transfer switching. The purpose of the Diesel locomotives is to eliminate all steam locomotives from the lake front in Chicago.

FREIGHT CARS

THE CENTRAL OF GEORGIA has given a tentative contract to the Pullman Car & Manufacturing Corporation for 200 hopper cars of 70 tons' capacity to be built at the latter company's Birmingham, Ala., plant. Work will be carried out subject to the approval of the Interstate Commerce Commission which is necessary owing to the financial features involved. Inquiry for this equipment was reported in the *Railway Age* of April 21.

PASSENGER CARS

ILLINOIS CENTRAL.—See item under locomotives regarding streamlined train for this road.

MISCELLANEOUS

Air Conditioning

The Atlantic Coast Line has ordered from the Safety Car Heating & Lighting Company air-conditioning equipment for seven dining cars for installation in the railroad company's shops.

The Louisville & Nashville has placed an order with the Safety Car Heating & Lighting Company for air-conditioning equipment which will be installed in eight dining cars in the railroad shop at South Louisville, Ky.

The Nashville, Chattanooga & St. Louis has ordered air-conditioning equipment from the Safety Car Heating & Lighting Company for air-conditioning three parlor cars and two dining cars the equipment to be installed at the railroad shops, Nashville, Tenn.

The Reading and the Central of New Jersey are now air conditioning two Pullman chair cars, one Pullman club car, two cafe cars, five coaches and two combination cars. These cars are to be used for operation between New York and Philadelphia, Pa. Bucket type seats will be provided in four of the coaches and new seats are to be installed in the parlor portion of the two cafe cars. The Pullman cars will be equipped with the Pullman mechanical system and the coaches and combination cars will have the B. & O. York type mechanical system of air conditioning.

Financial

BOSTON & MAINE.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon a branch line extending from Belmont Junction, N. H., to Belmont, 4 miles.

ERIE. — *Bonds.* — The Interstate Commerce Commission has authorized this company to pledge $4,000,000 of its refunding and improvement mortgage 6 per cent bonds, series of 1932, as collateral security for a note to the Railroad Credit Corporation. The loan involved was originally $1,900,000, which has been reduced to $1,362,253, and the collateral to be pledged will secure not only this note but other short term loans or renewal of loans by the Railroad Credit Corporation.

MANISTEE & NORTHEASTERN.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon a portion of its line extending from Kaleva, Mich., to Solon, 39.5 miles.

NEW YORK, NEW HAVEN & HARTFORD.—*R.F.C. Loan.*—This company has applied to the Reconstruction Finance Corporation for a loan of $3,000,000 to aid it in meeting requirements for taxes, interest, equipment trust maturities, and improvements and betterments.

Average Prices of Stocks and of Bonds

	June 19	Last week	Last year
Average price of 20 representative railway stocks.	43.78	43.52	40.89
Average price of 20 representative railway bonds.	78.86	78.56	68.60

Dividends Declared

Cincinnati Northern.—$6.00, semi-annually, payable July 31 to holders of record June 21.

Joliet & Chicago.—$1.75, quarterly, payable July 2 to holders of record June 20.

Mahoning Coal.—Common, $6.25, quarterly, payable August 1 to holders of record July 16; Preferred, $1.25, semi-annually, payable July 2 to holders of record June 25.

Northern Central.—$2.00, semi-annually, payable July 14 to holders of record June 30.

Providence & Worcester.—$2.50, quarterly, payable July 2 to holders of record June 13.

St. Joseph & Grand Island.—1st preferred, $5.00, payable June 30 to holders of record June 29.

Saratoga & Schenectady.—$3.00, semi-annually, payable July 15 to holders of record July 1.

Railway Officers

OPERATING

J. W. Bennett, a train dispatcher on the Chicago, Indianapolis & Louisville, has been promoted to chief dispatcher for the system, with headquarters as before at Lafayette, Ind., succeeding **R. E. Riggs,** deceased.

E. E. Ernest, superintendent of freight transportation of the Central region of the Pennsylvania, with headquarters at Pittsburgh, Pa., has been appointed superintendent of the Long Island, with headquarters at Jamaica, L. I., N. Y., to succeed **J. F. Henry,** who has been appointed superintendent of the Cincinnati division.

E. S. Reed, freight trainmaster on the Panhandle division of the Pennsylvania, with headquarters at Pittsburgh, Pa., has been promoted to superintendent of the Erie and Ashtabula division, with headquarters at New Castle, Pa., succeeding **C. W. VanNort.** Mr. VanNort has been appointed superintendent of freight transportation of the Central region, with headquarters at Pittsburgh, Pa., succeeding **E. E. Ernest,** who has been appointed superintendent of the Long Island, with headquarters at New York.

R. C. Morse, general superintendent of the New Jersey division of the Pennsylvania, with headquarters at New York, has been appointed general manager of the New York Zone, with jurisdiction, under the vice-president, over all P.R.R. operations in the New York area, with offices at Pennsylvania station, New York. Mr. Morse was born at Cleveland, Ohio, on March 18, 1882. He was graduated from the Sheffield Scientific School of Yale

R. C. Morse

University with a Ph.B. degree and entered railway service in 1907 as yard clerk on the Pennsylvania. He subsequently served as yardmaster, and trainmaster. Mr. Morse served in the World War from 1917 to 1918, returning to the service of the Pennsylvania following the war as superintendent of the Philadelphia terminal division. He was later appointed general superintendent of transportation at Chicago and subsequently transferred in the same position to Buffalo. Mr. Morse was appointed general superintendent at New York in June, 1927. In January, 1930, he was appointed assistant general manager of the New York Zone. This latter position was abolished in May, 1932, and Mr. Morse was appointed general superintendent, with headquarters in New York, the position he held at the time of his recent promotion.

ENGINEERING AND SIGNALING

R. R. Nace, engineer maintenance of way of the New Jersey division of the Pennsylvania, with headquarters at New York, has been appointed chief engineer maintenance of way of the New York Zone, with headquarters in the same city. Mr. Nace was born on August 27, 1882,

R. R. Nace

at Philadelphia, Pa. He entered railway service in December, 1901, serving until 1905 as rodman for the Pennsylvania. On the latter date he became transitman for the same road and from 1906 to 1911 he served as assistant supervisor. He became supervisor in 1911 and served in that position until 1918, when he became agent at Mantua Transfer. He next served as freight supervisor for the United States Railroad Administration. From the latter part of 1919 until March, 1920, Mr. Nace was assistant engineer maintenance of way for the P.R.R. and from the latter date until April, 1926, he was engineer maintenance of way of the East Ohio division of the Pennsylvania, at Pittsburgh, Pa. He next served as superintendent of the Schuylkill division with headquarters at Reading, Pa., and in March, 1927, he was appointed to a similar position on the Indianapolis division. In October, 1928, Mr. Nace was appointed chief engineer maintenance of way of the New York Zone of the Pennsylvania with headquarters at New York and when this position was abolished in May, 1932, Mr. Nace was appointed engineer maintenance of way, with headquarters at New York, in which position he served until his recent appointment.

MECHANICAL

W. Y. Cherry, superintendent of motive power of the New Jersey division of the Pennsylvania, with headquarters at New York, has been appointed general

W. Y. Cherry

superintendent of motive power of the New York Zone, with headquarters at the same point. Mr. Cherry was born at Fort Wayne, Ind., on June 21, 1873. He entered the service of the Pennsylvania on June 1, 1888, as a boilermaker apprentice. He later served as machinist apprentice, machinist and foreman machine shop gang and in December, 1907, he was appointed machine shop foreman. He became enginehouse foreman in January, 1912, serving in that position until February, 1917, when he was assigned to the office of the general superintendent of motive power, Lines West, as motive power inspector. Mr. Cherry was appointed master mechanic of the Grand Rapids & Indiana (part of the P.R.R.) in March, 1917, and in March, 1920, he was further advanced to the position of superintendent of motive power of the Lake division of the P.R.R. at Cleveland, Ohio. Mr. Cherry became superintendent of motive power of the Long Island (P.R.R. affiliate) in February, 1928, and when the New York Zone of the Pennsylvania was created in October of that year, Mr. Cherry became general superintendent of motive power of that zone. This position was abolished in May, 1932, and Mr. Cherry became superintendent of motive power at New York.

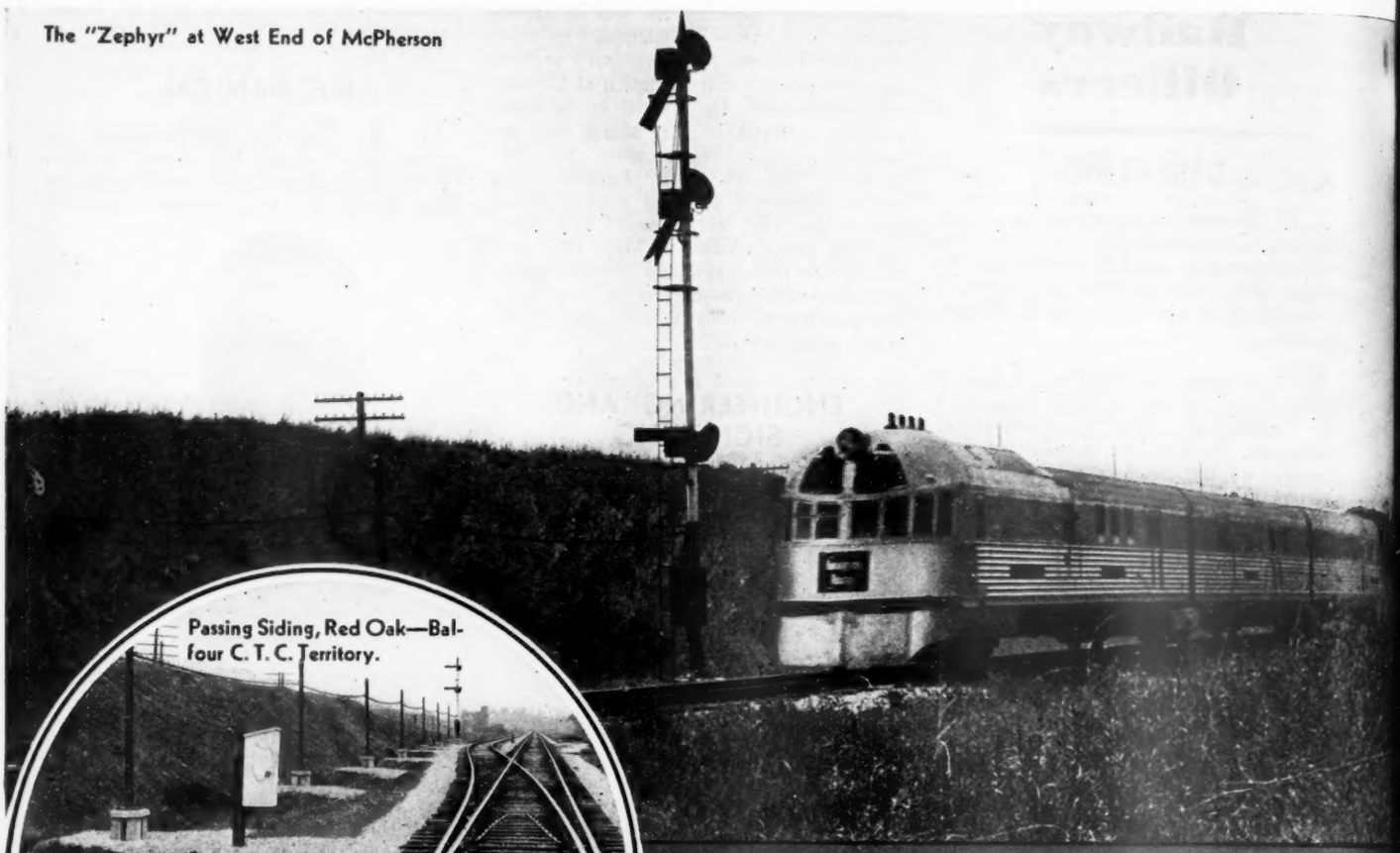
PURCHASES AND STORES

C. T. Coleman, general storekeeper of the Atlanta, Birmingham & Coast, with headquarters at Fitzgerald, Ga., has been appointed purchasing agent with headquarters at Atlanta, Ga., to succeed A. V. B. Gilbert.

OBITUARY

H. D. Row, assistant division engineer on the Erie at Huntington, Ind., died on May 13 at Burt Lake, Mich., following a heart attack.

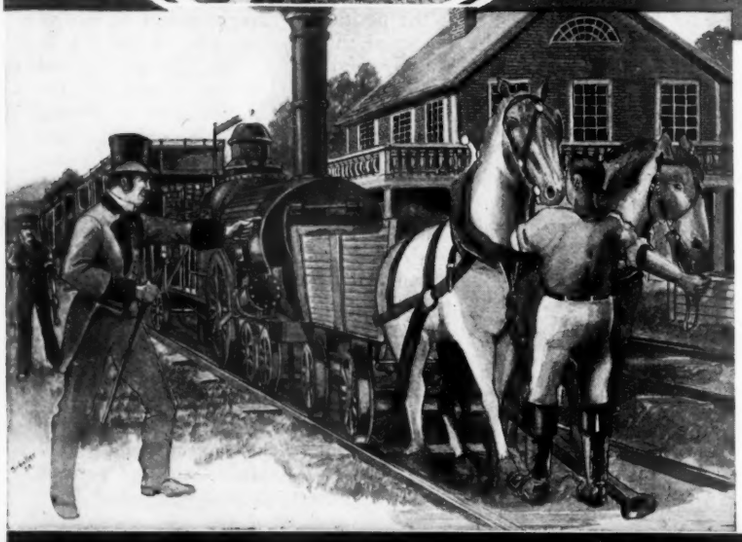
Table of Operating Statistics of Railways begins on second left-hand page



The "Zephyr" at West End of McPherson

Passing Siding, Red Oak—Balfour C. T. C. Territory.

NEW METHODS REPLACE THE OLD

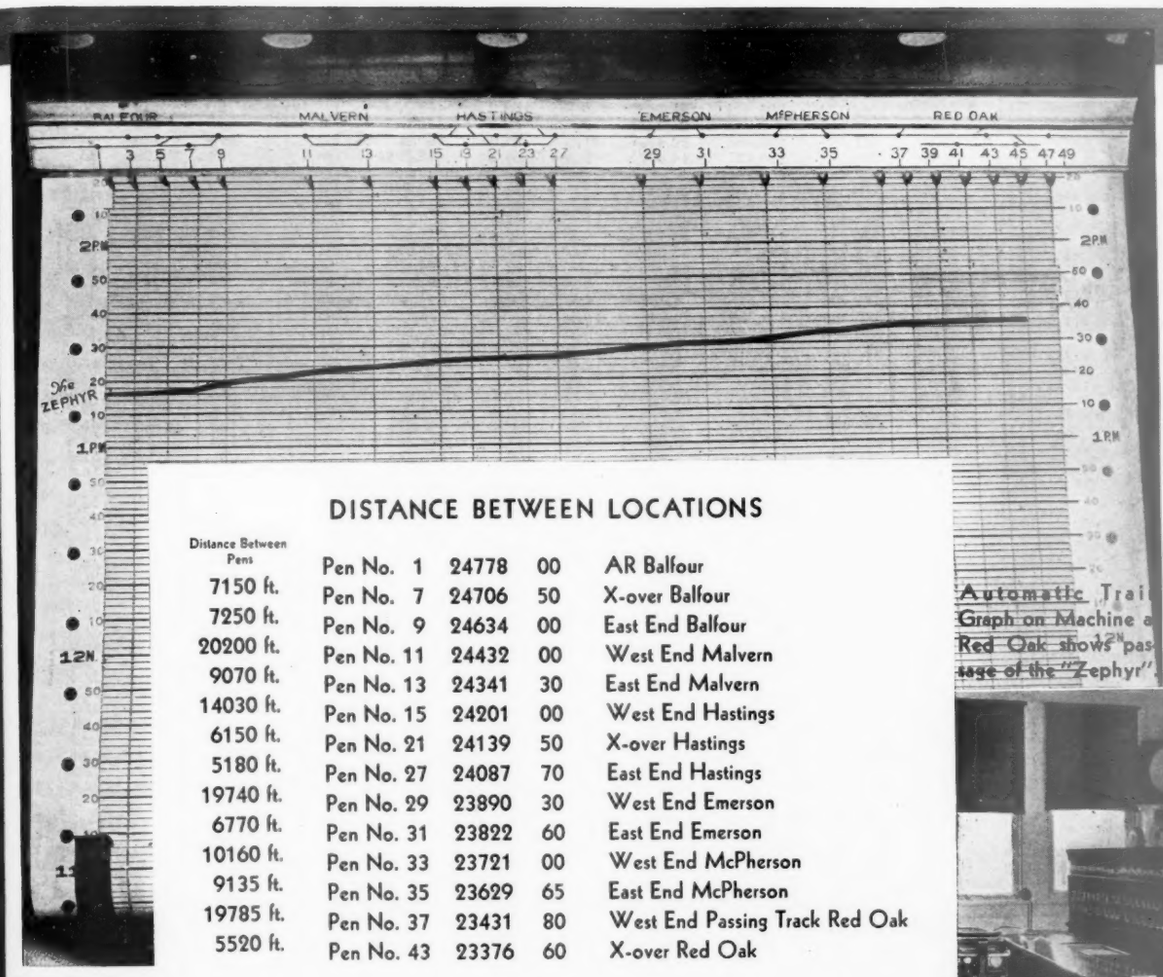


Compare traffic in the early days of travel on the Philadelphia & Columbia Railroad with the safe, speedy and economical operation of today on railway divisions equipped with "Union" Centralized Traffic Control. In those early days, the first car out on the line was usually the first to reach its destination.

Two "Union" C.T.C. installations aided the Burlington's "Zephyr" to make its world's record-breaking non-stop run from Denver to Chicago in 13 hours, 5 minutes. The "Zephyr" passed

DISTRICT OFFICES—

NEW YORK MONTREAL CHICAGO ST. LOUIS SAN FRANCISCO

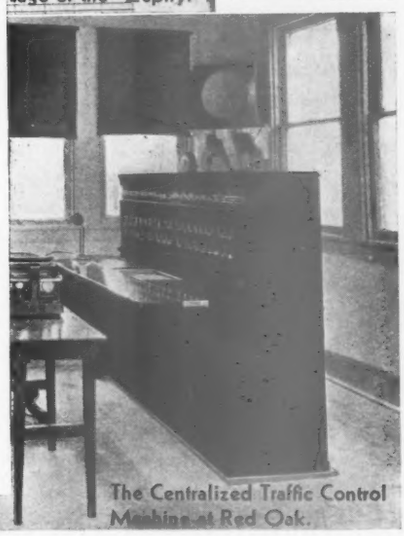


Automatic Train Graph on Machine at Red Oak shows passage of the "Zephyr".

DISTANCE BETWEEN LOCATIONS

Distance Between Pens				
7150 ft.	Pen No. 1	24778	00	AR Balfour
7250 ft.	Pen No. 7	24706	50	X-over Balfour
20200 ft.	Pen No. 9	24634	00	East End Balfour
9070 ft.	Pen No. 11	24432	00	West End Malvern
14030 ft.	Pen No. 13	24341	30	East End Malvern
6150 ft.	Pen No. 15	24201	00	West End Hastings
5180 ft.	Pen No. 21	24139	50	X-over Hastings
19740 ft.	Pen No. 27	24087	70	East End Hastings
6770 ft.	Pen No. 29	23890	30	West End Emerson
10160 ft.	Pen No. 31	23822	60	East End Emerson
9135 ft.	Pen No. 33	23721	00	West End McPherson
19785 ft.	Pen No. 35	23629	65	East End McPherson
5520 ft.	Pen No. 37	23431	80	West End Passing Track Red Oak
	Pen No. 43	23376	60	X-over Red Oak

It is of interest to note that the time recorded by Pen No. 35 is ten minutes later than that recorded by Pen No. 11 and the distance between these indication points is 15.2 miles. The average speed, therefore, was 93 m. p. h.



The Centralized Traffic Control Machine at Red Oak.

through the Greenwood-Waverly C.T.C. territory at about 110 m.p.h. and through the 26.6 mile Red Oak—Balfour C.T.C. territory in 19 minutes at an average speed of 84 m.p.h.

The automatic train graph above shows that between west end of Malvern and east end of McPherson the speed was about 93 m.p.h. The automatic train graph is one of the important operating features of "Union" C.T.C., being of great assistance to those responsible for train operation. It graphically places train movements constantly before the C.T.C. operator. "Union" Centralized Traffic Control, providing as it does for train operation by signal indication and graphically showing progress of train movements, is the modern system for expediting modern railroad traffic.

1881 **Union Switch & Signal Co.** 1934
SWISSVALE, PA.

Freight Operating Statistics of Large Steam Railways—Selected Items for the Month of March,

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (thousands)	Car-miles: Per cent loaded	Ton-miles (thousands): Gross Excluding locomotives and tenders	Ton-miles (thousands): Net Revenue and non-revenue	Average number of locomotives on line: Serviceable	Unserviceable	Per cent unserviceable	Stored
New England Region:												
Boston & Albany.....1934	402	128,263	133,189	9,203	3,296	67.6	169,833	56,194	66	36	35.6	17
1933	402	104,198	108,947	7,643	2,860	67.1	143,783	44,831	61	50	44.9	22
Boston & Maine.....1934	2,022	260,354	296,821	28,065	9,145	69.2	488,774	179,588	129	149	53.7	15
1933	2,059	232,659	263,043	22,326	7,528	68.2	398,627	139,405	123	163	57.1	17
N. Y., New H. & Hartf....1934	2,045	353,987	430,066	20,492	11,545	64.0	589,003	210,615	198	156	44.2	9
1933	2,048	294,145	358,427	14,807	9,204	65.1	486,899	164,905	229	128	35.9	55
Great Lakes Region:												
Delaware & Hudson.....1934	848	209,116	287,042	36,615	7,093	61.2	447,840	201,592	238	34	12.5	130
1933	848	168,498	221,442	22,957	5,322	62.0	323,330	139,571	253	29	10.3	170
Del., Lack. & Western....1934	992	354,404	392,375	47,633	11,220	63.8	660,728	250,423	180	79	30.5	38
1933	998	309,837	341,608	38,523	9,799	65.4	551,856	202,042	202	67	25.0	65
Erie (incl. Chi. & Erie)...1934	2,315	655,775	685,204	56,669	26,664	61.7	1,627,064	591,017	297	193	39.3	56
1933	2,316	557,858	576,061	45,026	22,810	62.7	1,374,681	498,424	300	193	39.2	105
Grand Trunk Western.....1934	1,007	239,165	240,539	2,363	6,241	58.4	384,369	124,890	72	80	52,6	..
1933	1,003	182,400	183,616	1,188	4,583	60.5	269,593	86,246	79	72	48.0	17
Lehigh Valley.....1934	1,335	388,186	406,256	36,049	11,823	64.8	698,122	269,497	175	142	44.6	12
1933	1,341	330,832	344,754	29,508	9,994	62.6	590,628	216,526	172	145	45.7	28
Michigan Central.....1934	1,967	437,627	438,412	18,368	14,707	59.1	863,863	260,339	141	42	23.0	21
1933	1,962	341,006	341,341	8,492	10,507	59.7	614,971	190,520	138	71	34.0	45
New York Central.....1934	6,418	1,423,131	1,515,005	101,746	51,221	59.9	3,186,032	1,256,982	587	487	45.4	32
1933	6,428	1,215,967	1,295,882	78,017	45,755	59.8	2,798,643	1,068,547	546	629	53.5	75
New York, Chi. & St. L...1934	1,661	478,958	483,345	4,879	14,460	59.8	874,368	302,705	120	49	29.2	15
1933	1,661	404,989	425,385	4,517	12,826	60.9	747,813	252,958	123	106	46.5	21
Pere Marquette.....1934	2,207	367,623	385,598	3,565	8,939	57.2	584,223	209,807	118	38	24.4	4
1933	2,286	290,786	306,450	2,706	6,832	58.7	436,225	157,781	121	56	31.6	23
Pitts. & Lake Erie.....1934	234	59,713	61,122	92	2,220	55.5	188,796	100,694	31	41	56.8	6
1933	231	46,038	46,877	679	1,835	56.8	155,871	85,068	27	44	62.3	8
Wabash 1934	2,445	547,066	554,852	11,209	16,466	59.6	986,907	306,201	163	180	52.4	51
1933	2,453	472,965	476,918	8,480	14,106	63.2	799,658	249,600	181	167	47.9	26
Central Eastern Region:												
Baltimore & Ohio.....1934	6,263	1,248,302	1,500,228	155,556	36,111	61.5	2,346,081	992,805	698	623	47.2	72
1933	6,283	1,080,344	1,306,686	134,667	31,840	60.9	2,056,638	856,897	721	575	44.4	207
Big Four Lines.....1934	2,655	542,371	558,974	21,487	15,597	60.9	969,952	400,978	204	146	41.7	22
1933	2,660	485,661	506,966	12,209	14,204	61.9	879,401	360,609	251	181	42.0	59
Central of New Jersey....1934	690	136,163	151,046	28,087	4,418	58.1	303,034	138,816	85	87	50.7	25
1933	692	123,126	134,376	22,056	3,825	56.6	261,766	117,345	117	61	34.0	66
Chicago & Eastern Ill. 1934	939	159,502	160,253	2,451	3,451	60.2	224,214	89,877	57	111	66.0	11
1933	939	153,980	154,169	2,382	2,934	61.5	184,960	72,812	69	97	58.6	29
Elgin, Joliet & Eastern....1934	446	81,386	83,168	1,492	1,937	59.0	151,939	73,885	64	25	27.5	11
1933	446	64,658	64,674	968	1,500	60.3	114,798	54,642	74	14	15.9	31
Long Island.....1934	396	29,120	29,734	13,770	311	54.4	22,350	8,695	30	27	47.3	..
1933	396	28,504	29,242	12,301	270	52.5	20,125	7,645	29	18	38.1	3
Pennsylvania System.....1934	10,088	2,534,754	2,817,103	302,932	85,467	60.8	5,705,827	2,433,859	1,432	967	40.3	277
1933	10,525	2,203,055	2,443,422	239,229	74,601	61.4	4,826,119	2,007,478	1,629	869	34.8	640
Reading 1934	1,454	385,516	421,782	45,348	10,634	58.8	754,489	348,544	256	130	33.7	72
1933	1,454	343,197	371,213	36,449	9,034	58.5	640,554	289,662	291	95	24.6	129
Pocahontas Region:												
Chesapeake & Ohio.....1934	3,112	768,228	809,466	32,062	31,953	54.7	2,701,944	1,429,100	458	97	17.5	130
1933	3,136	660,828	694,733	27,052	27,417	55.0	2,284,324	1,200,641	530	164	23.6	256
Norfolk & Western.....1934	2,164	554,722	579,920	27,373	21,468	59.2	1,749,052	912,565	415	53	11.4	176
1933	2,204	465,346	480,023	19,214	17,122	60.8	1,293,483	652,610	426	58	11.9	217
Southern Region:												
Atlantic Coast Line.....1934	5,145	571,704	572,982	7,539	11,931	62.3	635,196	215,836	322	131	28.9	72
1933	5,144	582,300	583,847	7,817	12,118	58.6	655,101	202,311	352	127	26.6	96
Central of Georgia.....1934	1,886	216,308	217,316	3,044	4,682	67.7	256,371	96,231	95	44	31.4	..
1933	1,904	191,215	192,374	3,009	4,208	68.8	222,220	81,366	85	55	39.5	..
Illinois Central (incl. 1934	6,618	1,302,750	1,318,100	24,040	29,280	58.5	1,895,139	715,801	593	332	35.9	1
Y. & M. V.).....1933	6,643	1,101,837	1,114,153	19,016	25,292	59.5	1,620,244	618,162	620	328	34.6	36
Louisville & Nashville.....1934	5,067	907,738	968,329	23,637	19,603	59.0	1,341,662	612,651	308	304	49.7	10
1933	5,165	780,019	822,638	17,370	16,280	59.3	1,074,848	465,695	353	345	49.4	76
Seaboard Air Line.....1934	4,297	489,034	504,862	3,959	11,987	62.8	701,767	241,527	208	75	26.5	..
1933	4,373	474,824	492,197	3,154	11,309	61.5	666,997	221,999	236	60	20.3	37
Southern 1934	6,599	1,119,298	1,135,739	17,208	25,363	65.1	1,400,210	517,797	614	298	32.7	113
1933	6,602	1,012,761	1,025,717	18,552	23,934	66.2	1,283,771	466,340	725	191	20.9	222
Northwestern Region:												
Chi. & North Western....1934	8,443	908,556	951,959	20,709	22,867	62.5	1,357,353	468,790	572	240	29.5	143
1933	8,443	790,619	825,693	20,109	20,146	63.6	1,171,041	392,851	583	242	29.3	236
Chicago Great Western....1934	1,463	211,364	212,191	13,495	6,621	58.9	407,822	136,142	61	35	36.1	1
1933	1,463	187,588	188,452	15,394	5,614	58.5	348,778	116,971	60	41	41.0	3
Chi., Milw., St. P. & Pac. .1934	11,157	1,080,107	1,141,640	51,297	28,631	61.8	1,753,746	677,616	530	345	39.4	178
1933	11,234	1,021,089	1,078,014	52,274	26,427	61.6	1,639,655	640,026	720	188	20.7	379
Chi., St. P., Minneap. & 1934	1,653	194,570	203,492	8,646	4,279	64.8	248,995	98,412	125	30	19.3	59
Om. 1933	1,697	185,793	192,429	7,505	3,795	69.3	219,320	87,082	139	35	20.2	77
Great Northern.....1934	8,335	560,004	564,415	16,714	17,282	68.1	1,033,555	444,612	428	170	28.5	113
1933	8,424	498,671	502,378	12,758	14,522	69.2	862,298	377,382	471	139	22.7	163
Minneap., St. P. & S. St. 1934	4,281	327,837	332,698	2,516	7,203	64.3	412,251	163,271	122	43	25.9	4
M. 1933	4,314	306,492	310,415	1,909	6,593	66.6	375,238	156,684	132	44	25.1	10
Northern Pacific.....1934	6,414	488,161	532,630	36,873	15,521	70.3	887,596	371,965	361	150	29.4	54
1933	6,400	425,837	452,576	29,548	12,900	71.7	723,022	309,606	393	128	24.5	110
Oreg.-Wash. R. R. & Nav. .1934	2,111	136,459	141,479	7,921	3,469	65.2	202,017	74,402	76	44	36.5	19
1933	2,146	116,952	121,197	7,026	3,123	71.4	174,189	69,820	76	44	36.3	25
Central Western Region:												
Alton 1934	923	191,010	193,991	1,120	3,776	60.2	235,024	71,951	49	45	48.3	..
1933	952	166,989	167,903	1,062	3,480	57.5	221,153	71,218	57	48	45.7	7
Atch., Top. & S. Fe (incl. 1934	11,414	1,333,968	1,388,850	49,854	36,481	62.8	2,179,256	702,830	602	316	34.4	186
P. & S. F.).....1933	11,609	1,233,614	1,330,754	48,011	33,465	65.0	1,957,570	645,053	667	270	28.8	256
Chi., Burl. & Quincy.....1934	9,096	1,074,408	1,117,563	32,814	27,741	61.2	1,620,651	648,178	440	121	21.6	3
1933	9,157	948,161	976,154	26,167	23,506	60.2	1,386,347	548,513	444	155	25.9	63
Chi., Rock I. & Pac. (incl. 1934	8,334	969,832	988,984	5,525	21,139	58.2	1,307,490	448,578	448	153	25.5	107
Chi., Rock I. & Gulf)...1933	8,333	908,100	924,145	6,366	20,128	58.5	1,232,844	427,157	454	156	25.6	113
Denver & R. G. Wn.....1934	2,469	188,728	204,592	18,751	5,673	67.2	326,552	125,820	166	60	26.6	37
1933	2,514	153,258	166,328	16,838	4,509	68.8	258,139	103,510	195	41	17.4	76
Los Angeles & Salt Lake..1934	1,232	153,546	172,351	21,058	4,360	67.0	260,390	100,242	74	22	22.8	10
1933	1,239	129,078	143,643	16,141	3,837	71.4	212,325	80,286	72	36	33.6	7
Oregon Short Line.....1934	2,456	221,753	230,835	14,509	5,835	63.8	346,329	122,297	123	59	32.6	35
1933	2,453	200,146	208,586	13,517	5,028	65.1	295,106	109,346	137	54	28.1	55
Southern Pacific—Pacific 1934	8,669	1,029,019	1,107,171	124,970	32,099	59.0	2,045,267	628,440	527	339	39.1	159
Lines 1933	8,878	838,554	892,653	88,042	25,880	63.0	1,558,647	494,825	513	385	42.8	204
Union Pacific.....1934	3,768	827,540	849,782	36,581	30,809	63.2	1,792,383	586,471	306	126	29.2	99
1933	3,768	678,775	700,800	34,672	23,691	64.2	1,375,452	471,061	358	117	24.6	•188
Southwestern Region:												
Gulf, Colo. & S. Fe.....1934	1,906	183,918	189,157	2,439	4,272	61.5	265,065	100,428	86	38	30.9	20
1933	1,943	182,505	186,506	2,559	4,484	59.9	274,727	100,813	92	32	25.9	24
Mo.-Kans.-Texas Lines....1934	3,282	356,072	359,013	4,565	9,274	60.0	561,560	187,840	153	76	33.3	69
1933	3,282	331,682	333,573	4,736	8,245	61.4	477,856	166,520	153	78	33.9	74
Missouri Pacific 1934	7,333	1,061,475	1,098,877	23,006	29,714	61.3	1,841,726	646,965	395	158	28.6	118
1933	7,385	929,558	956,807	21,447	25,054	62.1	1,527,110	549,051	410	167	28.9	166
St. Louis-San Francisco....1934	5,118	602,122	608,875	7,467	13,481	60.8	833,715	321,974	390	86	18.1	149
1933	5,193	582,484	587,819	6,265	12,740	60.2	789,846	306,460	394	75	16.0	159
St. Louis Southwestern 1934	1,798	235,467	238,440	3,053	5,721	55.1	359,948	106,663	89	42	32.1	3
Lines 1933	1,902	177,290	188,984	2,549	4,603	61.3	268,905	89,569	104	28	20.8	30
Texas & New Orleans.....1934	4,464	487,660	488,035	7,661	10,967	60.7	670,761	229,528	217	84	28.0	41
1933	4,474	432,065	432,460	6,593	9,607	62.7	557,884	184,907	216	96	30.6	51
Texas & Pacific.....1934	1,946	239,051	239,051	2,171	6,808	58.2	429,374	139,991	160	77	32.5	91
1933	1,946	240,342	240,342	1,637	7,309	59.8	452,878	154,117	187	61	24.5	85

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

1934, Compared with March, 1933, for Roads with Annual Operating Revenues Above $25,000,000

Region, road and year		Average number of freight cars on line: Home	Foreign	Total	Per cent unserviceable	Gross ton-miles per train-hour, excluding locomotives and tenders	Gross ton-miles per train-mile, excluding locomotives and tenders	Net ton-miles per train-mile	Net ton-miles per loaded car-mile	Net ton-miles per car-day	Car-miles per car-day	Net ton-miles per mile of road per day	Pounds of coal per 1,000 gross ton-miles, including locomotives and tenders	Locomotive-miles per locomotive-day
New England Region:														
Boston & Albany	1934	3,039	3,462	6,501	24.2	22,270	1,324	438	17.0	288	25.0	4,663	153	46.4
	1933	4,629	2,829	7,458	39.4	22,093	1,380	430	15.7	200	19.1	3,720	163	35.0
Boston & Maine	1934	9,511	7,132	16,643	14.5	26,578	1,877	690	19.6	360	26.5	2,961	106	39.0
	1933	9,729	7,078	16,807	14.5	23,983	1,726	604	18.5	279	22.1	2,274	108	33.3
N. Y., New H. & Hartf.	1934	14,836	10,610	25,446	13.1	25,254	1,664	595	18.2	276	23.6	3,434	112	42.4
	1933	16,965	8,461	25,426	8.8	25,505	1,655	561	17.9	216	18.5	2,684	113	34.8
Great Lakes Region:														
Delaware & Hudson	1934	11,259	2,788	14,047	4.2	28,230	2,142	964	28.4	478	27.5	7,922	114	39.6
	1933	12,727	2,039	14,766	3.7	25,134	1,919	828	26.2	315	19.4	5,486	121	28.9
Del., Lack. & Western	1934	16,900	4,706	21,606	11.4	28,357	1,864	707	22.3	386	27.1	8,416	151	56.7
	1933	19,032	3,274	22,306	11.7	27,019	1,781	652	20.6	302	22.4	6,747	135	47.0
Erie (incl. Chi. & Erie)	1934	30,981	13,356	44,337	4.7	40,043	2,481	901	22.2	444	32.5	8,509	103	50.5
	1933	35,869	10,685	46,554	5.3	39,408	2,464	893	21.9	357	26.0	7,173	99	42.0
Grand Trunk Western	1934	4,676	9,726	14,402	18.2	30,552	1,607	522	20.0	289	24.7	4,135	105	53.3
	1933	5,649	6,826	12,475	19.4	27,673	1,478	473	18.8	230	20.2	2,867	106	40.8
Lehigh Valley	1934	18,193	6,016	24,209	20.3	32,311	1,798	694	22.8	371	25.1	6,730	136	46.6
	1933	19,849	4,018	23,867	20.7	31,504	1,785	654	21.7	302	22.3	5,383	138	39.3
Michigan Central	1934	20,177	22,137	42,314	9.9	36,751	1,974	595	17.7	205	19.6	4,412	107	83.4
	1933	26,556	17,190	43,746	10.5	33,883	1,803	559	18.1	145	13.4	3,237	118	55.7
New York Central	1934	61,823	59,981	121,804	22.6	36,803	2,239	883	24.5	344	23.4	6,529	103	50.2
	1933	81,634	54,642	136,276	27.0	36,486	2,302	879	23.4	261	18.7	5,541	99	39.0
New York, Chi. & St. L.	1934	8,479	7,425	15,904	4.2	33,345	1,826	632	20.9	634	50.7	6,076	101	96.5
	1933	13,379	5,808	19,187	12.1	32,783	1,847	625	19.7	439	36.6	5,078	102	62.5
Pere Marquette	1934	11,094	5,912	17,006	2.6	27,326	1,589	571	23.5	411	30.6	3,168	98	83.4
	1933	13,295	3,832	17,127	2.5	26,032	1,500	543	23.1	307	22.6	2,300	92	58.4
Pitts. & Lake Erie	1934	16,957	10,290	27,247	31.4	43,272	3,162	1,686	45.4	123	4.9	14,364	108	28.5
	1933	17,756	7,062	24,818	32.6	48,771	3,386	1,848	46.4	114	4.3	12,265	105	22.2
Wabash	1934	13,330	9,262	22,592	4.2	37,414	1,804	560	18.6	452	40.8	4,175	114	55.0
	1933	18,119	7,135	25,254	5.3	35,209	1,691	528	17.7	329	29.5	3,392	109	46.5
Central Eastern Region:														
Baltimore & Ohio	1934	80,638	21,447	102,085	18.0	25,560	1,879	795	27.5	324	19.2	5,284	156	41.8
	1933	97,770	15,321	113,091	16.1	25,785	1,904	793	26.9	253	15.4	4,546	148	37.1
Big Four Lines	1934	18,203	22,969	41,172	13.9	32,192	1,788	739	25.7	325	20.7	5,035	120	55.3
	1933	20,579	18,440	39,019	20.3	32,282	1,811	743	25.4	308	19.6	4,519	120	40.1
Central of New Jersey	1934	16,642	6,902	23,544	33.7	26,699	2,226	1,019	31.4	197	10.8	6,707	157	34.8
	1933	17,919	5,161	23,080	27.1	26,621	2,126	953	30.7	169	9.8	5,653	134	29.3
Chicago & Eastern Ill.	1934	5,834	2,280	8,114	25.3	25,490	1,406	563	26.0	369	23.5	3,191	134	32.2
	1933	6,197	1,914	8,111	18.4	22,620	1,201	473	24.8	299	19.6	2,585	136	31.4
Elgin, Joliet & Eastern	1934	9,126	3,454	12,580	25.5	17,003	1,867	908	38.1	196	8.7	5,521	120	31.7
	1933	9,825	3,455	13,280	24.0	15,931	1,775	845	36.4	137	6.2	4,084	119	24.9
Long Island	1934	773	3,330	4,103	2.1	6,181	768	299	28.0	71	4.6	732	285	25.6
	1933	797	3,028	3,825	1.8	5,690	706	268	28.3	67	4.5	643	304	29.5
Pennsylvania System	1934	244,832	47,566	292,398	12.5	32,815	2,251	960	28.5	277	16.0	8,042	127	43.4
	1933	253,821	38,621	292,442	9.6	31,772	2,191	911	26.9	229	13.8	6,358	128	35.8
Reading	1934	35,696	8,174	43,870	15.4	23,578	1,957	904	32.8	265	13.7	7,992	158	40.3
	1933	39,938	6,424	46,362	20.1	23,560	1,866	844	32.1	208	11.1	6,641	150	35.2
Pocahontas Region:														
Chesapeake & Ohio	1934	41,615	10,531	52,146	1.6	49,821	3,517	1,860	44.7	914	37.3	15,309	79	50.5
	1933	47,752	8,213	55,965	1.7	49,006	3,457	1,817	43.8	715	29.7	12,763	79	34.7
Norfolk & Western	1934	35,242	4,311	39,553	3.7	47,395	3,153	1,645	42.5	769	30.6	14,057	107	43.3
	1933	41,629	4,204	45,833	3.2	41,571	2,780	1,402	38.1	475	20.5	9,870	115	34.4
Southern Region:														
Atlantic Coast Line	1934	26,268	7,021	33,289	25.0	19,605	1,111	378	18.1	216	19.2	1,398	120	42.7
	1933	27,903	6,888	34,791	18.9	20,714	1,125	347	16.7	194	19.8	1,311	118	41.2
Central of Georgia	1934	7,000	2,203	9,203	25.3	21,292	1,185	445	20.6	349	25.1	1,701	130	52.8
	1933	7,229	1,881	9,110	24.6	20,397	1,162	426	19.3	298	22.4	1,425	131	46.5
Illinois Central (incl. Y. & M. V.)	1934	52,904	14,251	67,155	39.1	25,465	1,455	549	24.4	355	24.8	3,605	140	48.4
	1933	55,232	12,330	67,562	27.1	25,030	1,470	561	24.4	305	21.0	3,102	140	39.8
Louisville & Nashville	1934	48,067	7,909	55,976	30.4	23,032	1,478	675	31.3	365	19.8	4,030	143	54.0
	1933	55,499	6,326	61,825	23.4	20,704	1,378	597	28.6	251	14.8	3,005	149	40.1
Seaboard Air Line	1934	11,864	6,497	18,361	5.8	23,258	1,435	494	20.1	438	34.6	1,874	118	59.9
	1933	12,926	5,624	18,550	5.9	23,009	1,405	468	19.6	399	33.1	1,692	122	55.7
Southern	1934	31,906	14,855	46,761	16.6	20,854	1,251	463	20.4	369	27.8	2,615	154	42.2
	1933	32,570	17,079	49,649	18.0	20,883	1,268	460	19.5	313	24.3	2,355	148	38.0
Northwestern Region:														
Chi. & North Western	1934	42,617	17,525	60,142	11.1	23,804	1,494	516	20.5	260	20.3	1,851	131	39.9
	1933	46,044	15,906	61,950	9.7	22,872	1,481	497	19.5	211	17.0	1,551	125	34.2
Chicago Great Western	1934	2,378	2,622	5,000	2.9	34,997	1,929	644	20.6	908	74.9	3,102	136	78.5
	1933	4,364	2,624	6,988	12.4	32,712	1,859	624	20.8	558	45.8	2,664	134	67.2
Chi., Milw., St. P. & Pac.	1934	56,050	13,955	70,005	5.4	25,437	1,624	627	23.7	323	22.0	1,024	125	45.4
	1933	60,669	13,028	73,697	4.2	24,806	1,606	627	24.2	289	19.4	1,899	121	41.5
Chi., St. P., Minneap. & Om.	1934	2,055	6,480	8,535	11.7	18,380	1,280	506	23.0	384	25.8	1,985	106	45.6
	1933	2,266	6,007	8,273	10.0	17,398	1,180	469	22.9	351	22.1	1,710	117	38.3
Great Northern	1934	42,317	8,661	50,978	7.9	27,493	1,846	794	25.7	291	16.6	1,778	126	32.4
	1933	44,310	7,338	51,648	6.4	26,040	1,729	757	26.0	244	13.5	1,493	127	28.1
Minneap., St. P. & S. St. M.	1934	16,200	3,263	19,463	5.6	19,369	1,257	498	22.7	280	19.2	1,271	111	67.7
	1933	19,458	2,555	22,013	3.7	18,810	1,224	511	23.8	238	15.1	1,211	107	59.2
Northern Pacific	1934	40,445	3,851	44,296	13.2	27,706	1,818	762	24.0	280	16.6	1,933	148	37.1
	1933	43,531	3,431	46,962	11.2	26,056	1,698	727	24.0	220	12.8	1,612	146	30.9
Oreg.-Wash. R. R. & Nav.	1934	8,463	1,726	10,189	5.5	24,090	1,480	545	21.4	243	17.4	1,175	141	41.5
	1933	8,100	1,585	9,685	9.4	23,735	1,489	597	22.4	240	15.1	1,085	139	35.7
Central Western Region:														
Alton	1934	3,211	5,817	9,028	22.7	27,218	1,230	377	19.1	266	23.2	2,600	150	69.2
	1933	3,771	5,405	9,176	17.9	26,562	1,324	426	20.5	259	22.0	2,495	147	53.6
Atch., Top. & S. Fe (incl. P. & S. F.)	1934	63,385	8,307	71,692	13.2	31,177	1,634	527	19.3	327	27.0	2,052	110	52.2
	1933	67,101	7,244	74,345	11.5	29,819	1,587	523	19.3	289	23.1	1,852	113	49.0
Chi., Burl. & Quincy	1934	36,929	12,286	49,215	10.6	26,580	1,508	603	23.4	439	30.7	2,375	126	68.4
	1933	43,021	10,861	53,882	9.8	25,228	1,462	579	23.3	339	24.2	1,997	124	55.8
Chi., Rock I. & Pac. (incl. Chi., Rock I. & Gulf)	1934	33,796	10,208	44,004	24.2	23,873	1,348	463	21.2	340	27.5	1,794	141	55.2
	1933	40,472	10,124	50,596	17.9	23,021	1,358	470	21.2	281	22.7	1,709	138	50.8
Denver & R. G. Wn.	1934	14,090	2,330	16,420	5.0	27,143	1,730	667	22.2	255	17.1	1,699	164	33.0
	1933	14,584	2,351	16,935	4.2	26,188	1,684	675	23.0	204	12.9	1,373	166	25.8
Los Angeles & Salt Lake	1934	5,116	883	5,999	9.5	29,677	1,696	653	23.0	557	36.1	2,713	139	67.2
	1933	4,878	946	5,824	6.9	28,708	1,645	622	20.9	458	30.7	2,159	142	49.5
Oregon Short Line	1934	9,055	3,484	12,539	17.3	26,939	1,562	552	21.0	325	24.3	1,660	115	45.0
	1933	10,468	3,430	13,898	18.1	25,298	1,474	546	21.7	262	18.5	1,486	121	38.8
Southern Pacific—Pacific Lines	1934	36,403	22,642	59,045	9.4	32,093	1,988	611	19.6	355	30.7	2,416	106	47.4
	1933	41,060	21,449	62,509	13.2	30,152	1,859	590	19.1	264	21.9	1,858	114	36.4
Union Pacific	1934	23,592	8,060	31,652	21.5	50,807	2,166	709	19.0	618	51.4	5,188	108	68.3
	1933	25,773	6,881	32,654	20.7	44,299	2,026	694	19.9	481	37.7	4,167	114	51.6
Southwestern Region:														
Gulf, Colo. & S. Fe	1934	14,843	1,540	16,383	7.2	24,938	1,441	546	23.5	204	14.1	1,756	116	51.7
	1933	13,889	1,684	15,573	5.4	25,260	1,505	552	22.5	216	16.0	1,729	111	50.8
Mo.-Kans.-Texas Lines	1934	8,993	2,899	11,892	2.5	29,077	1,577	528	20.3	527	43.3	1,908	91	52.9
	1933	10,535	2,330	12,865	5.9	25,887	1,441	502	20.2	431	34.8	1,691	96	48.8
Missouri Pacific	1934	21,170	16,741	37,911	4.4	31,769	1,735	609	21.8	569	42.6	2,941	121	67.6
	1933	27,061	14,089	41,150	14.6	24,527	1,643	591	21.9	445	32.7	2,478	128	56.5
St. Louis-San Francisco	1934	22,461	4,673	27,134	6.6	24,739	1,385	535	23.9	396	27.2	2,097	130	43.2
	1933	25,785	4,528	30,313	5.8	23,361	1,356	526	24.1	337	23.3	1,967	135	42.2
St. Louis Southwestern Lines	1934	4,611	3,063	7,674	8.7	28,439	1,529	453	18.6	463	45.1	1,977	92	61.6
	1933	4,739	2,468	7,207	10.4	27,209	1,517	505	19.5	414	34.7	1,569	107	48.5
Texas & New Orleans	1934	7,850	10,909	18,759	7.1	24,368	1,375	471	20.9	408	32.1	1,714	90	54.8
	1933	9,220	10,726	19,946	6.5	21,785	1,291	428	19.2	309	25.6	1,378	92	46.9
Texas & Pacific	1934	3,544	4,486	8,030	7.0	28,069	1,796	586	20.6	581	48.5	2,398	86	33.9
	1933	5,898	5,061	10,959	13.7	29,767	1,884	641	21.1	469	37.2	2,640	83	32.5

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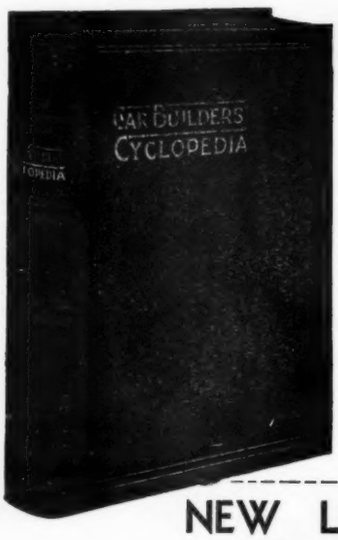

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